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Vol. 43 JANUARY, 1957 No. 1

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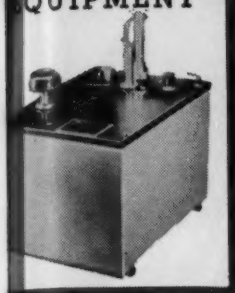

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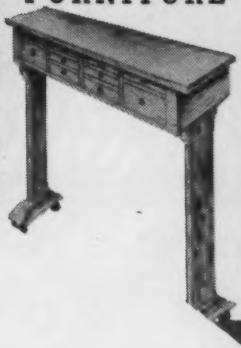

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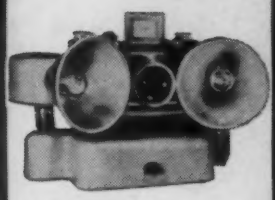

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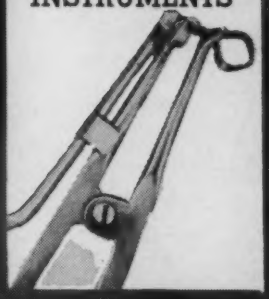

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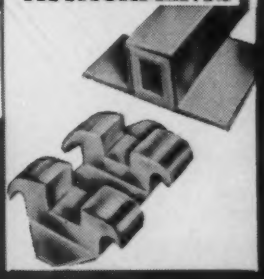

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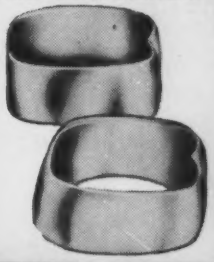

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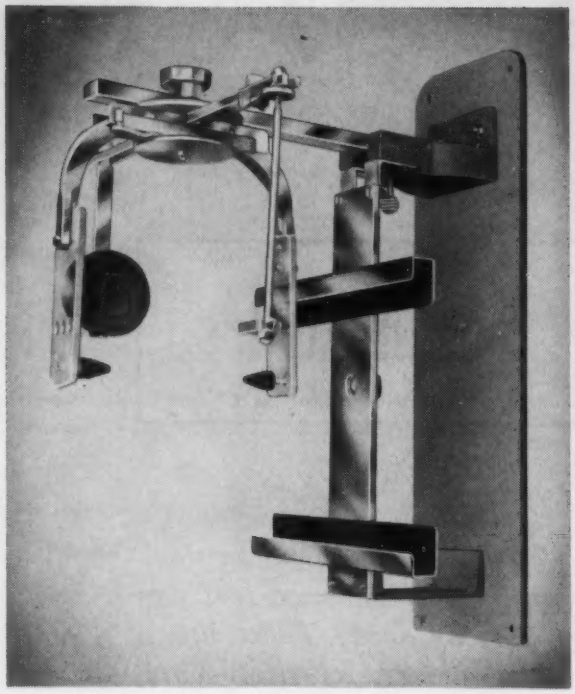

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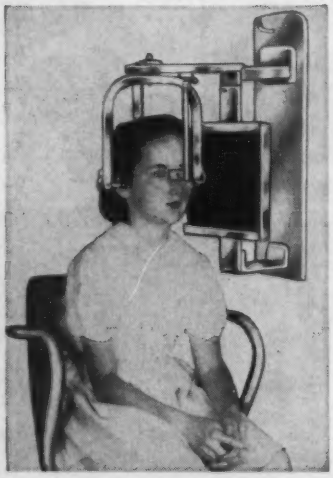

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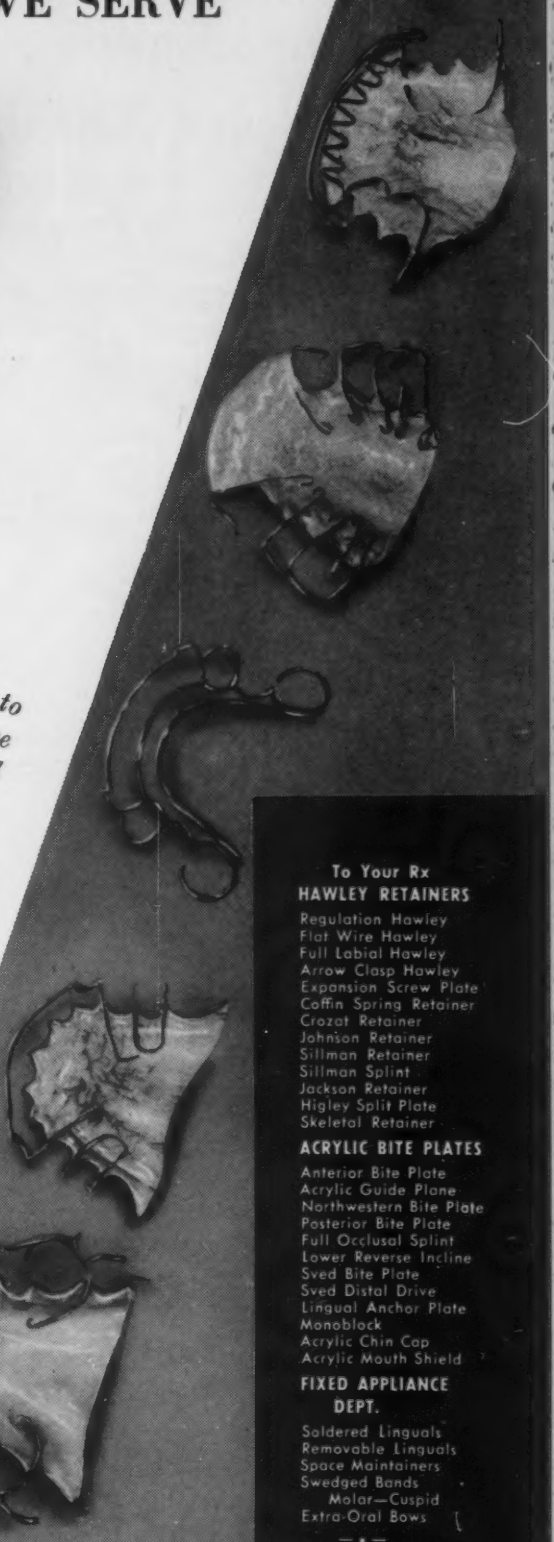

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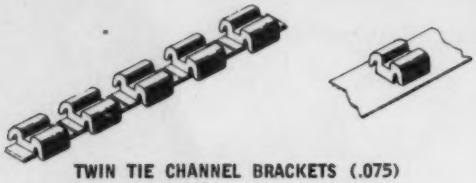

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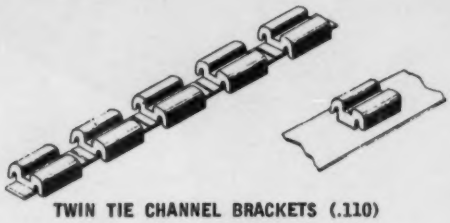

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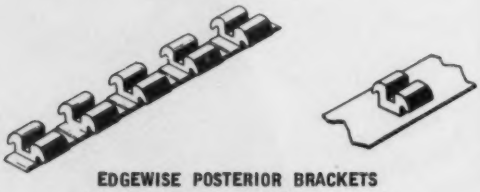

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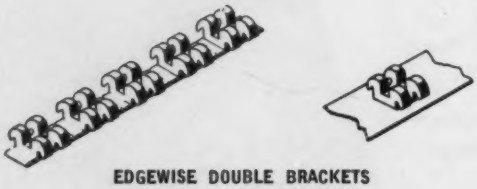

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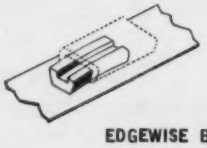

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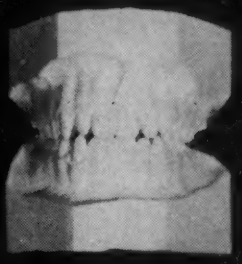

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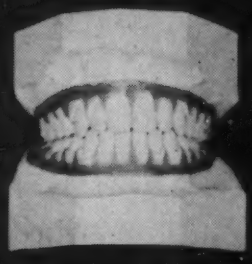

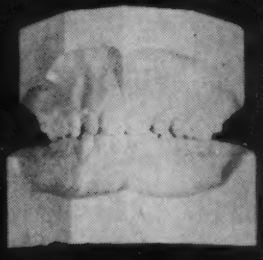

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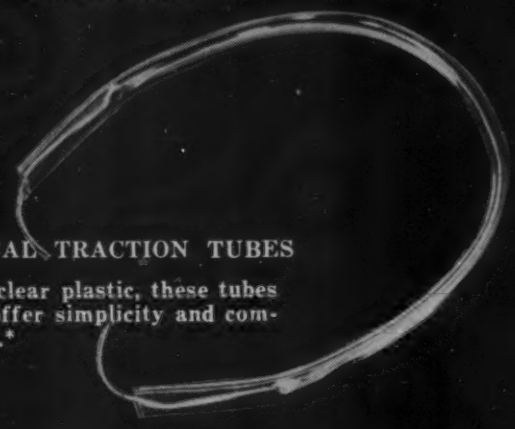

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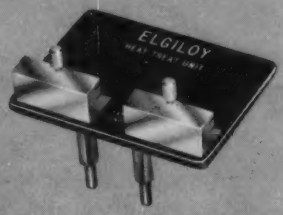

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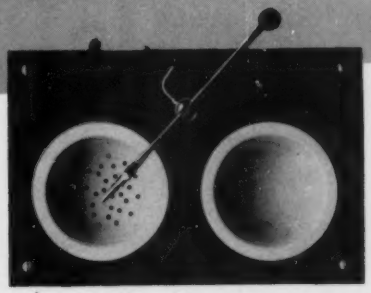

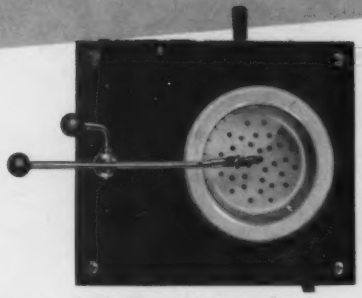

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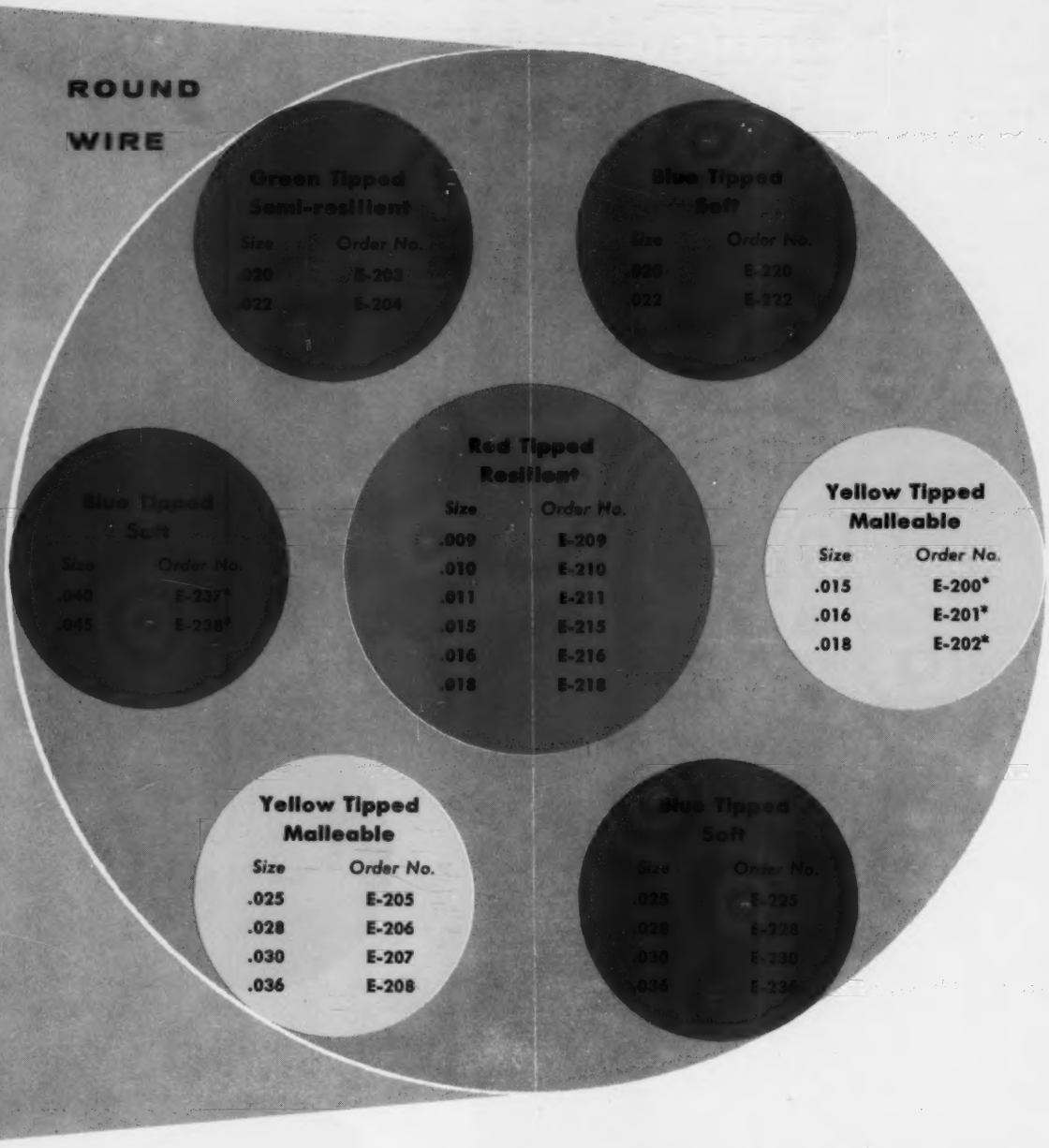

Green Tipped Semi-resilient

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.036	E-208

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.025	E-225
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.030	E-230
.036	E-236

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Size	Order No.	Size	Order No.
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.010 x .022	E-261	.015 x .028	E-265
.011 x .022	E-262	.015 x .036	E-266*
.010 x .028	E-263		

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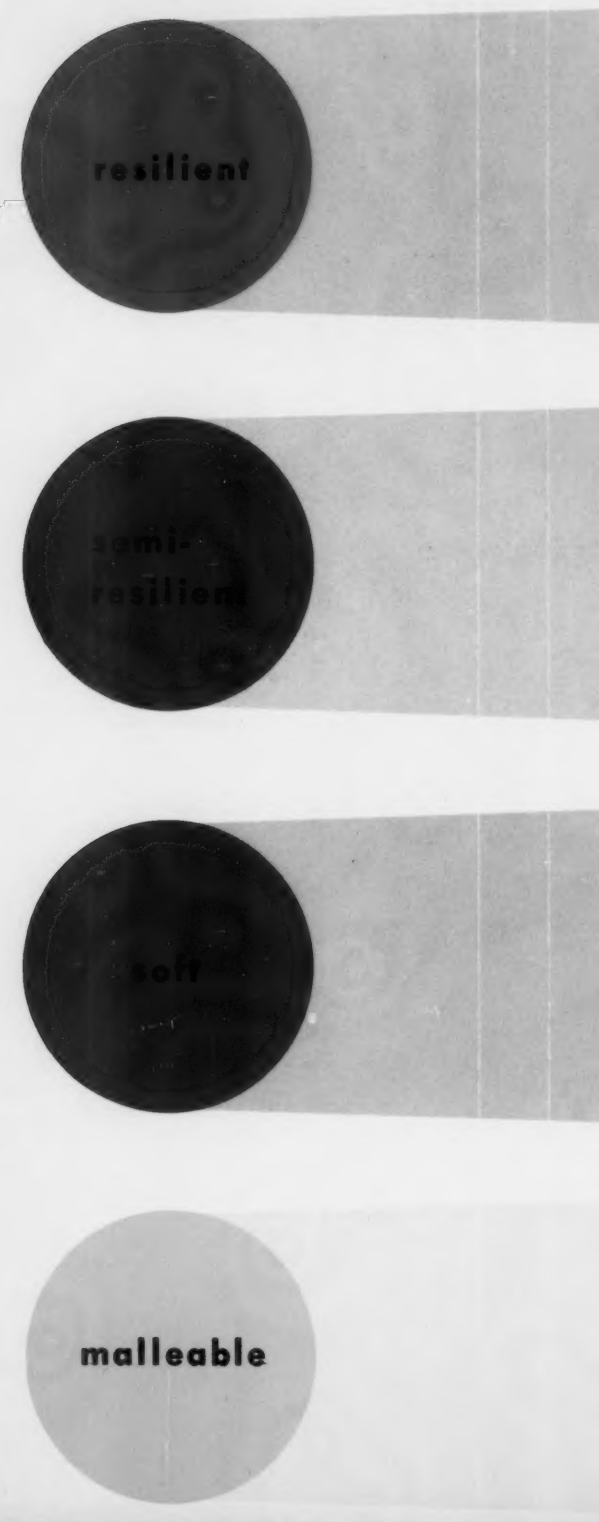

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Four colors identify the different types of Elgiloy Wire. These colors, which appear on the tips of each length of wire, facilitate identification and are easily removed.

RED WIRE IS RESILIENT—ready-to-use—as working arch wire. It can be shaped with the fingers, but it will not take sharp bends by pliers. If greater spring qualities are desired, any of several heat-treating procedures can be applied. After heat-treating, red wire will fracture, if bent or adjusted sharply. Red tipped Elgiloy is excellent for twin arch and similar small wire techniques.

GREEN WIRE IS SEMI-RESILIENT. It is excellent for certain round wire arches, as it can be shaped and bent slightly with fingers and pliers without fracturing. It is recommended that the efficiency of the wire be increased by heat-treating after initial adjustment—or shortly after the case has been started. (Green wire will fracture after heat-treating, if bent severely.) Green Elgiloy is recommended for starting arches in edgewise techniques.

BLUE WIRE IS SOFT. It is easily shaped and bent with either the fingers or pliers. Heat-treating brings the wire up to an ideal spring temper, which permits it to be adjusted slightly more than yellow wire after heat-treating. Blue tipped Elgiloy is especially effective for edge-wise arches, plier-formed Ellis Lingual Arches, and for auxiliary springs larger than .018.

YELLOW WIRE IS MALLEABLE. It can be bent considerably with fingers and pliers without fracturing. Yellow wire is to be heat-treated after initial bending. (Yellow Elgiloy will allow only minute adjustments after heat-treating.) It is excellent for labial arches, soldered linguals, retainers, flat and ribbon arch techniques, Crozats, and for small auxiliary springs from .015 to .018.

American Journal
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VOL. 43 JANUARY, 1957 No. 1

Original Articles

PRESIDENT'S ADDRESS, PACIFIC COAST SOCIETY OF ORTHODONTISTS

ARNOLD E. STOLLER, D.D.S., SEATTLE, WASH.

IT IS my pleasure to welcome you to Seattle for the twenty-fourth general meeting of the Pacific Coast Society of Orthodontists.

We are grateful to the members of the Central Component for their untiring efforts in serving as hosts for the last fifteen consecutive meetings of this Society in San Francisco. They culminated their efforts last year by hosting one of the finest meetings of the American Association of Orthodontists. We owe a debt of gratitude to the Central Component members and, without fear of criticism, recognize the efforts of Fred West, past-president of the A.A.O., as "the wheel" in this smooth-running organization.

It has been three and one-half years since we have had a general meeting of our Society, although other sections of the A.A.O. meet every year. This has made a very difficult administration problem. We are the second largest section of the A.A.O., with 330 active members and 83 associate members, a total of 413 members. This last year, our growth was larger than that of any other section. The average growth was fifteen new members, and the Pacific Coast Society increased by thirty new members. It should not be too long before we will be the largest section in the A.A.O. Our Society also covers the largest area. To make our organization function efficiently, it is important that the meetings on the *component* level be used as a sounding board for the many "growing pain" problems which are arising. The directors met most of the day yesterday and will be bringing these problems to you for your consideration. Give them serious thought and open discussion.

Presented at the annual meeting of the Pacific Coast Society of Orthodontists in Seattle, Washington, Aug. 13, 1956.

The factor of lapse of time between meetings of the P.C.S.O. was brought vividly to my attention by one of our past presidents, Ben Reese. He came to me immediately after I had taken office as president and said, "Arnie, there shouldn't be too much time between meetings of the P.C.S.O. because we all have wonderful friends up and down the coast and we don't see each other often enough. If we don't meet, we may never see some of them again." Ben's words were unforgettable, as he passed away in May, 1954. With this thought in mind, I think it fitting and proper that we pause at this time to pay our respects to those who have passed on since our last meeting. Please stand in reverence while these names are read:

E. R. Schroeder, Alameda, California, February, 1953
Leland C. Carter,* San Francisco, California, March, 1953
John V. Mershon, Philadelphia, Pennsylvania, 1953
John H. Conroy, San Francisco, California, March, 1953
Allen H. Suggett,* Santa Barbara, California, March, 1953
Ray McClinton, Menlow Park, California, May, 1953
Charles Boyd, Los Angeles, California, September, 1953
Thomas R. Sweet, Oakland, California, December, 1953

Ben L. Reese,* Los Angeles, California, May, 1954
Earl Andrews, Hollywood, California, April, 1954
A. S. Maxon, Walla Walla, Washington, May, 1954
J. Robert Smith, San Diego, California, September, 1954
Vernon L. Hunt, Eureka, California, September, 1954
Albert E. Voss, Los Angeles, California, December, 1954

Howard Dunn, Oakland, California, January, 1955
Eugene Springer, Los Angeles, California, January, 1955
John M. Griffin, Los Angeles, California, January, 1955
J. Camp Dean,* Desert Hot Springs, California, December, 1955

Kenneth F. Terwilliger, San Francisco, California, May, 1956
Raymond Hunt, San Bernardino, California, 1956
Carl Engstrom, Santa Cruz, California, 1956

In this regard, I would like to bring to your attention that a memorial to Dr. Kenneth Terwilliger has been set up at the University of California in the form of a loan fund for orthodontic students. No memorial could be finer than one that furthers the profession to which Dr. Terwilliger gave so much.

I may appear to digress abruptly at this point, but it is pertinent. I wish to discuss a plan which I am using for making charges to members of the medical and other allied professions for orthodontic care of their families and which I have been asked to present to you. We occasionally find ourselves

*Past-president.

in the position of discounting the fee from 10 to 100 per cent. A full fee for the case is estimated and the professional colleague is asked to donate the full fee to a graduate school or a memorial fund to further the progress of orthodontics. He then enjoys the privilege of using his orthodontic fee as a tax-deductible item and at the same time you, the orthodontist, know that you are helping a worthy cause. The reaction to this plan is one of appreciation and admiration. I am grateful to our past-president, George Barker, for suggesting it.

Since our last meeting we have adopted a new constitution and bylaws. Credit for much of the tedious work in the preparation of this document goes to Don MacEwan. We have also added the classification of "associate member." This, along with our rapid growth, has imposed a terrific problem in varying degrees of logistics for our secretary-treasurer, Ray Curtner. Ray has worked diligently and efficiently. We are indebted to him for a job well done.

We have a *Bulletin* that is published four times a year. Reuben Blake, our faithful editor, is nearing his one hundredth edition, as he has been editor for twenty-four consecutive years. Thanks are due Rube for his faithful efforts.

It has been my privilege and pleasure to represent your Society on the board of directors of the A.A.O. for the last three years. At the recent meeting in Boston the most important consideration was an amendment to the bylaws which changes our membership requirements. It allows those who have had preceptorship training *only* to join the A.A.O., provided that the preceptorship training is properly controlled and regulated. This amendment is printed in the July issue of the AMERICAN JOURNAL OF ORTHODONTICS. May I urge every member to read it and discuss it thoroughly at the component level. This will be voted upon at the meeting of the A.A.O. in New Orleans next May.

The A.A.O. is also subsidizing a Cephalometric Workshop in December. The objective is to bring together orthodontists, physical anthropologists, growth researchers, radiologists, x-ray technicians, and biostatisticians. The purpose of this workshop is to standardize technique, to clarify interpretation, and to evaluate clinical application.

At the A.A.O. meeting in San Francisco, Dr. West suggested that a special committee be authorized to study the matter of patient referrals from one orthodontist to another. This report will be published in the JOURNAL soon.

Following this address, the charge will be given to new members. This is a tradition of the Pacific Coast Society. The imposing number of new members since our last meeting is evidence of our growth. It is my suggestion that our Society supplement this and set up an indoctrination course on the component level. This would include obligations to patients and the Society, methods and ethics of handling transfer cases, and possibly informal discussions on public relations.

The committees which were set up for this meeting are headed by our efficient general chairman, Jim Keenen. With his organizational ability, we have been sitting and waiting for you to come and enjoy our meeting. I wish to thank every committee chairman and all committee members for their willing response to the call to duty. I know that I can speak for all members of the Northern Component in stating our appreciation for your coming to Seattle to meet with us personally. May I humbly thank you for the honor and privilege of serving you.

ARCH WIDTH IN THE PREMOLAR REGION—STILL THE MAJOR PROBLEM IN ORTHODONTICS

ASHLEY E. HOWES, D.D.S., NEW ROCHELLE, N. Y.

CEPHALOMETRICS has been a great boon to the specialty of orthodontics, in both research and practice. It has given us a greater knowledge of facial pattern, growth direction, facial development, and familial characteristics. It has given the green light to some treatments and the red one to others. It has sped the change from tooth tinkering to facial orthopedics. While it has been criticized as a two-dimensional approach to a three-dimensional problem, I am confident that the men who use it, whether for recording growth, for case analysis, or for treatment planning, are as aware of its limitations as its critics are. It is unfortunate that, with laminographic radiography still in its infancy, only the height and depth of the face and denture can be readily portrayed because the third dimension, width—not just facial width, but dental arch width—is possibly the most important of the three. Lack of arch width in the premolar area is a major cause of irregular teeth and the resultant malocclusion. Abnormal skeletal pattern can be responsible for severe malocclusion with the teeth in even alignment, but this is not common.

Stressing the importance of arch width to a present-day orthodontic audience may seem almost Victorian, but this article contains several statements which perhaps bear repetition. How much more do we know about arch width now than we knew years ago? What is the reason for this lack of lateral development of the deciduous dentition? Is it due to an inherited skeletal size, or is it due to misguided or restricted growth which, in turn, is possibly the result of abnormal muscular function? Could it be a combination of both these factors, or a myriad of other factors too complex for present comprehension? The mysteries of arch development join those of tooth decay in remaining obscure, and our treatment planning remains a guessing game.

Many studies of the facial skeletal profile have been made in an effort to determine in what kinds of faces we find good occlusion with even alignment of the teeth. These faces are often referred to in orthodontic parlance as "good" facial patterns. Conversely, facial types in which we rarely, if ever, find good occlusions are often termed "poor" facial patterns. The range of variation of these good faces has been tabulated by several investigators, with some differences of opinion concerning the limits of the range and ways of recording it. The range described by Downs is by now well known, as are the ANB angle of Northwestern University and Margolis' maxillofacial triangle.

Read before the Central Section of the American Association of Orthodontists, Chicago, Illinois, Oct. 1, 1956.

While facial pattern has been studied principally in profile, Broadbent and others have shown anteroposterior views as well. So far, however, measurements of dental and basal arch width can be obtained more accurately from measuring the dental casts.

From personal observation, we all know that there can be considerable variation in the bizygomatic and bigonial width of faces with good or poor profile patterns. Some authors believe that there is a rather definite relationship between bizygomatic width and maxillary arch width in the molar region. Bizygomatic width was not recorded in all the cases used in this report, but at least 200 such measurements, along with bigonial width, have been made. These bizygomatic and bigonial measurements indicate that wide faces and wide dental arches generally go together, but not always. However, it would seem that the possibilities for beneficial expansion of the dental arch are greater in the wide face than in the narrow face.

MATERIALS

Inasmuch as the profile pattern has achieved such widespread popularity, both as a means of study and as a diagnostic aid, it was decided to see what its ranges of variation were in cases of malocclusion and to determine whether or not there are any correlations between the profile pattern and arch dimensions. The records of 232 cases were tabulated, noting the extremes and means of twenty-six factors. These factors included the Downs Analysis measurements, the SNA and SNB angles, the difference between the two angles, and the AB-occlusal plane angle, all of which were taken from the profile radiographs. Also included were maxillary and mandibular measurements of tooth material, coronal arch width in the first premolar region, basal arch width in the first premolar region, basal arch midline length, and percentage relationships of arch width and length to tooth material.

In a previous article,[1] a record sheet (Fig. 1) was described which graphically portrays the so-called range of normal of the twenty-six factors being considered in this article. The two upper polygon forms are those suggested by Voorhies and Adams[2] for the Downs[3] measurements. The SNA and SNB angles and their difference as described at Northwestern University are recorded in the box on the left, and in the box on the right the AB-occlusal plane angle is recorded. The importance of this angle first impressed me when it was found that, in orthographic projections of normal occlusions, the outlines of the maxillary and mandibular basal arches superimposed or, if they did not, then the mandibular basal arch was slightly in advance of the maxillary basal arch. When such surveys were made, the models were levelled on the occlusal plane. Inasmuch as the Downs "A" point is the apex of the maxillary basal arch and the Downs "B" point is the apex of the mandibular basal arch, this indicated that in the profile radiograph of normal occlusion a line connecting points "A" and "B" should be perpendicular to the occlusal plane or, if not perpendicular, the "B" point should be slightly forward of the "A" point.

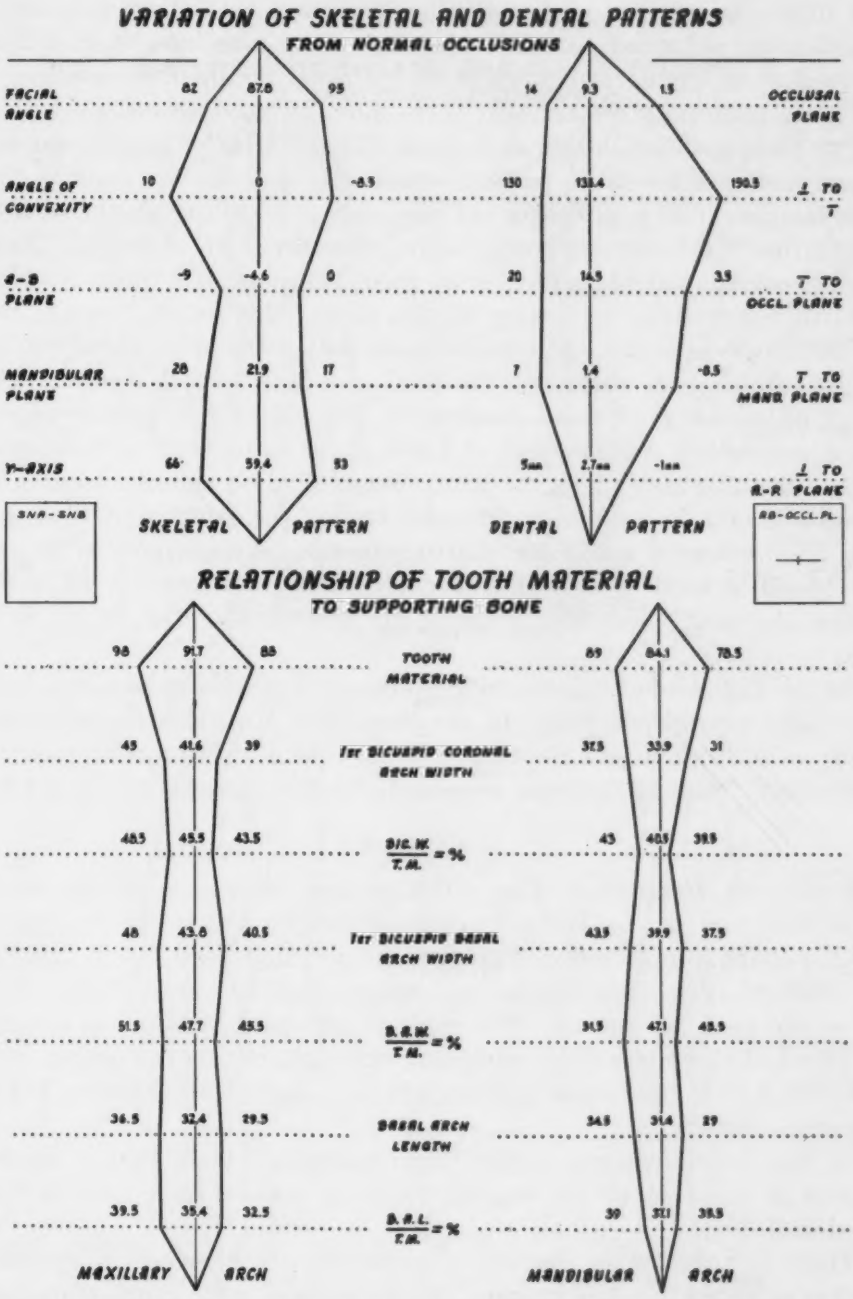

Fig. 1.—The two outline forms at the top are Voorhies and Adams' polygonic portrayal of Downs' appraisal of normal facial and dental variations in profile. The two lower forms represent various minimum and maximum limits of maxillary and mandibular arches of normal dentures and the relationship of these measurements to tooth material. (From Howes: AM. J. ORTHODONTICS, November, 1954.)

The lower polygons represent minimum and maximum limits of various measurements made on casts of normal dentures. The sample used was small (only fifteen cases), but since adopting this sheet as a diagnostic and treatment planning aid, other good occlusions have been examined which fall within, or very close to, the normal range in both skeletal and arch dimensions. However, I am now quite certain that there must be good occlusions with larger teeth and larger arches, although I think that the relative percentages of tooth size and arch size for white persons would remain about the same as they are in this sample. This is evidently not true of Negroes, although the sample used to make this chart contained one Negro. However, Dr. Alexander Jacobson[4] of Johannesburg analyzed a number of good occlusions of African Negroes, and registered his findings on a copy of this chart. He found that the teeth of these persons were larger, the anterior teeth were more procumbent, the coronal and basal arches were wider, and the basal arch lengths were shorter. The percentage relationships of tooth material to arch width fell within the pattern, but the percentage relationships of tooth material to basal arch length were less than in this chart. It is the interrelation of tooth material to arch dimensions that results in regular or irregular teeth, Incidentally, if these polygon forms are used as a guide for charting deviations from normal in cases of malocclusion, it must be constantly borne in mind that this is a static analysis and that the most important factor of all, *growth potential,* is not being recorded.

Of the 232 cases of malocclusion examined, 145 were permanent dentitions and 87 were mixed dentitions. In the permanent dentitions the premolars and canines were erupted and the second molars were about to erupt or already had erupted. Most of the cases were in Hellman's Stage III B or III C.

FINDINGS

Permanent Dentitions.—The extremes and the means of the twenty-six factors examined in the 145 permanent dentitions are shown in Fig. 2. In skeletal pattern (upper left polygon), the facial angle and the Y axis (growth axis) differed little from the normal range, with the mean being about the same as the mean for normal. The angle of convexity, A-B plane, and mandibular plane all had much wider ranges of variation, but 50 per cent of the cases fell wholly within the normal pattern and the mean of all the cases fell within the normal pattern.

In the dental pattern (upper right polygon), there is not much more variation in the cant of the occlusal plane in malocclusion than is found in normal occlusion.

There is an extreme amount of variation (62 degrees) in the axial inclination of upper to lower incisors. There is also a wide range of variation in the lower incisor-occlusal plane angle, and about the same amount in the lower incisor-mandibular plane angle. There is a variation of 22 mm. (nearly 1 inch) in the relation of maxillary central incisor to the "A-P" plane.

On examining the variations found in malocclusion in tooth material and arch dimensions (the two lower polygons), we find that there is a wide variation

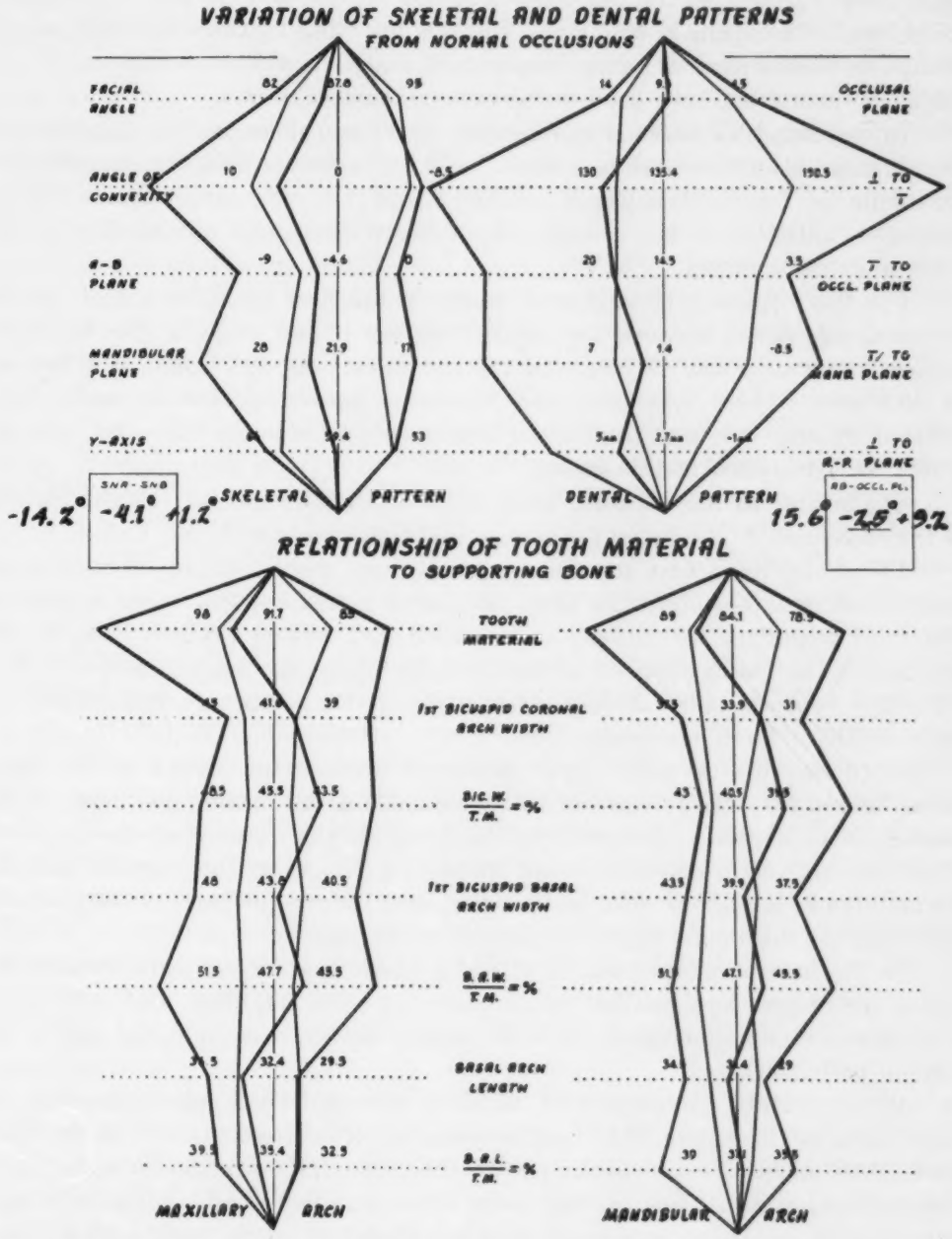

Fig. 2.—Extremes and means of twenty-six factors examined in 145 dentitions (heavy line).

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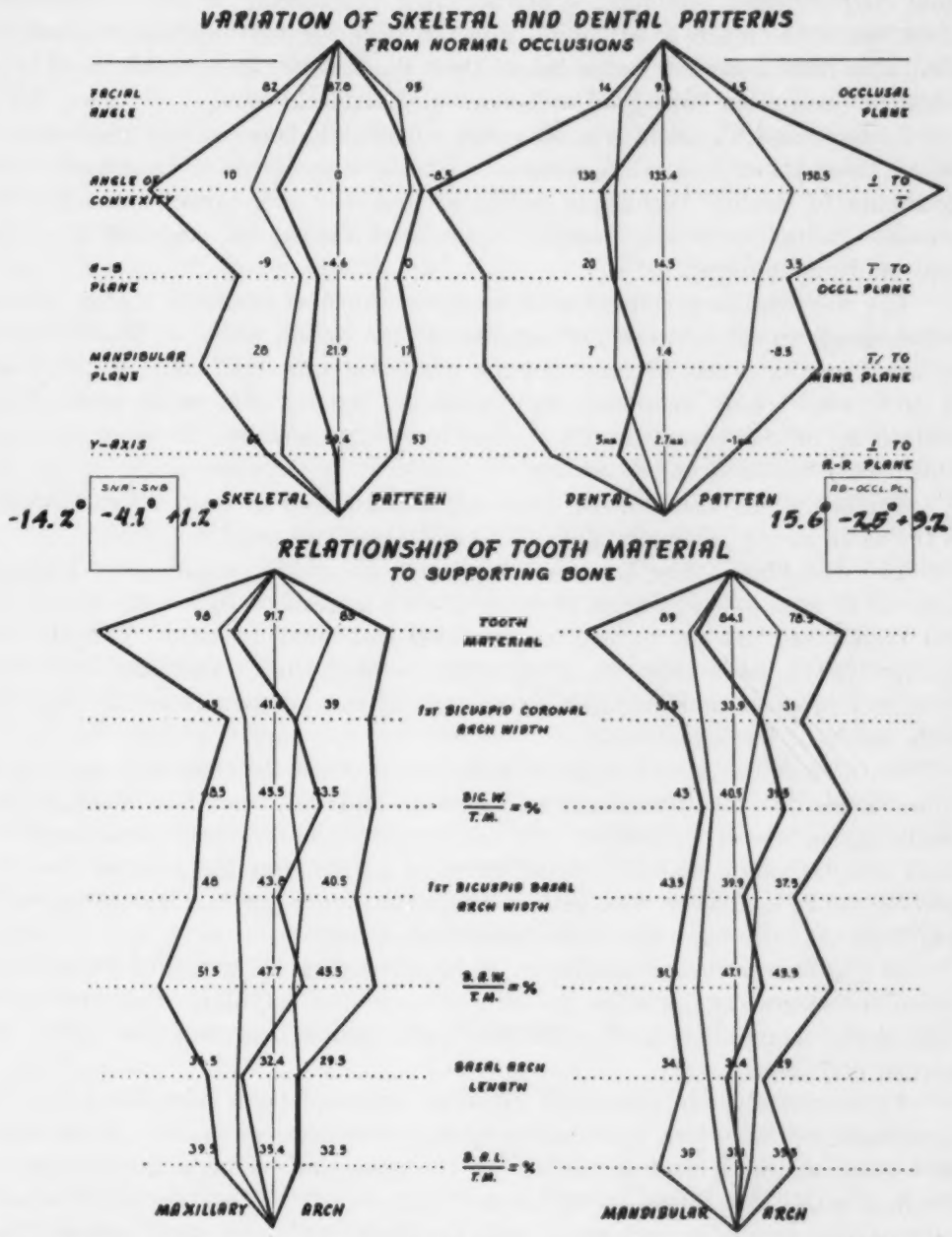

Fig. 2.—Extremes and means of twenty-six factors examined in 145 dentitions (heavy line).

in the amount of tooth material in various persons. ("Tooth material," as used in this article means the sum of the mesio-distal diameters of twelve teeth, from first molar to first molar, inclusive.) In the maxilla, this measurement ranged from a maximum of 112 mm. to a minimum of 78 mm., a difference of 34 mm. The mean is 96.7 mm., which is near the maximum of the normal occlusions measured and 1 mm. larger than Black's averages, which must have included teeth from both good occlusions and malocclusions.

In the mandible there is a difference of 30 mm. between the greatest and the smallest amount of tooth material. The average is 88.6 mm., nearly the maximum of normal occlusions measured and 1.8 mm. larger than Black's average. Large teeth are a major factor contributing to irregularity of the teeth and malocclusion.

For the maxillary coronal arch width in the first premolar region, which is the measurement between the summits of the buccal cusps of the first premolars, the widest was 47 mm. and the narrowest was 30.77 mm., a difference of 16.3 mm. These maximum and minimum figures of coronal arch width differed by only 0.3 mm. from a study previously made on 125 cases, none of which were included in this group.

The mean maxillary coronal arch width of all the cases was 39 mm., which is the same as the minimum for the normal cases measured.

The mandibular first premolar coronal arch width ranged from a maximum of 40 mm. to a minimum of 26 mm., with a mean of 30.5 mm., or slightly less than minimum for normal cases which had smaller teeth. This, in my opinion, is the major problem of orthodontics—large teeth and narrow arches. This fact becomes more evident on examining the percentage relationship of arch width to tooth material.

In the maxilla there is a large difference between the maximum and minimum figures for this percentage relationship, and the mean falls short of the minimum for normal occlusions. In the mandible the difference between maximum and minimum amounts is not quite as great as in the maxilla, but the normal range is smaller also, so that the mean figure for the malocclusions is less than the minimum figure for normal occlusions.

In the first premolar basal arch width there is a difference of 19 mm. between the largest and smallest measurements in the maxillary arch and of 14 mm. in the mandibular arch, with the means slightly less than the means for normal occlusions.

Unfortunately, the cases with large or oversized teeth were often not the same cases as those with wide basal arches, which becomes evident in the basal arch tooth material relationship. Here the mean falls outside the pattern on the inadequate side. Just as very large teeth are often found in patients with very narrow arches, so very small teeth are found with very wide arches; these conditions produce the extremes shown on the chart. Children with wide arches and small teeth are brought to the orthodontist to have spaces closed. (The condition is generally combined with a deep overbite.)

In a large group of persons, all combinations of tooth size and arch size are found—small teeth with wide arches, small teeth with narrow arches, large

teeth with wide arches, and large teeth with narrow arches. The orthodontist's task is to try to differentiate between a disharmony of tooth size to arch width imposed by genetic limits and one produced by abnormal muscular forces. To maintain a full complement of teeth in the former may be a mistake, while in the latter extraction might be avoided if treatment is started early enough.

Basal arch length, as used in this article, is the median line length of the arch from "A" point in the maxilla and "B" point in the mandible to the intersection of the median line and a plane perpendicular to the occlusal plane, touching the distal surfaces of the first molars. It is measured directly on the cast, with calipers. The models do not have to be sectioned for this measurement to be made. Basal arch length to the distal surfaces of the first molars is rarely inadequate in the maxilla and is not very often inadequate in the mandible. (That is, if the normal cases used for comparison are reliable criteria.) This is hard to believe and it may be that the samples of normal occlusion used to make up this chart were all wide, short arches. Perhaps there are normal occlusions whose basal arches are longer and narrower than those which we were able to find to make up this chart. Many of the maxillary basal arches of the malocclusions were much longer than those of the normal occlusions and the mean was 4 mm. longer than the mean for the normal occlusions. As stated before, the mean tooth material is considerably greater for the malocclusions, but when we divide the maxillary basal arch length by the maxillary tooth material the percentage relationship is greater than the normal mean.

In the mandible, the mean basal arch length for the malocclusions was 1.5 mm. longer than the mean of the normal occlusions but, because of the larger teeth in the malocclusions, the mean figure of the mandibular basal arch length divided by tooth material was slightly less than for the normal occlusions. It is a common observation that when mandibular arches are expanded by orthodontic forces, the tendency is for them to foreshorten. In persons with naturally wide arches and small teeth, however, there is no tendency for the molars to move forward, and all the teeth, posterior as well as anterior, remain spaced. The arches of these persons are often just as long as are those with a much greater amount of tooth material with all the teeth in contact. The controlling factor appears to be the amount of bone that exists for the support of the teeth.

Fig. 3 shows the incidence of the various factors of malocclusion under consideration.

The following are of possible interest: In the skeletal pattern, 93 per cent fell within the normal range in facial angle, and 99 per cent were within the range of normal in the Y axis angle. Only 26 per cent had a mandibular plane angle of more than 28 per cent, which was Downs' maximum limit for normal occlusions. More about that later.

In the dental pattern (upper right), the occlusal plane angle fell within the normal range in 96 per cent of the cases. In other words, facial angle, Y-axis, and occlusal plane angle have (with few exceptions) the same range of variation in malocclusion as in good occlusion. In 68 per cent of the cases, the maxillary-mandibular incisor angle was greater than 130 degrees, Downs'

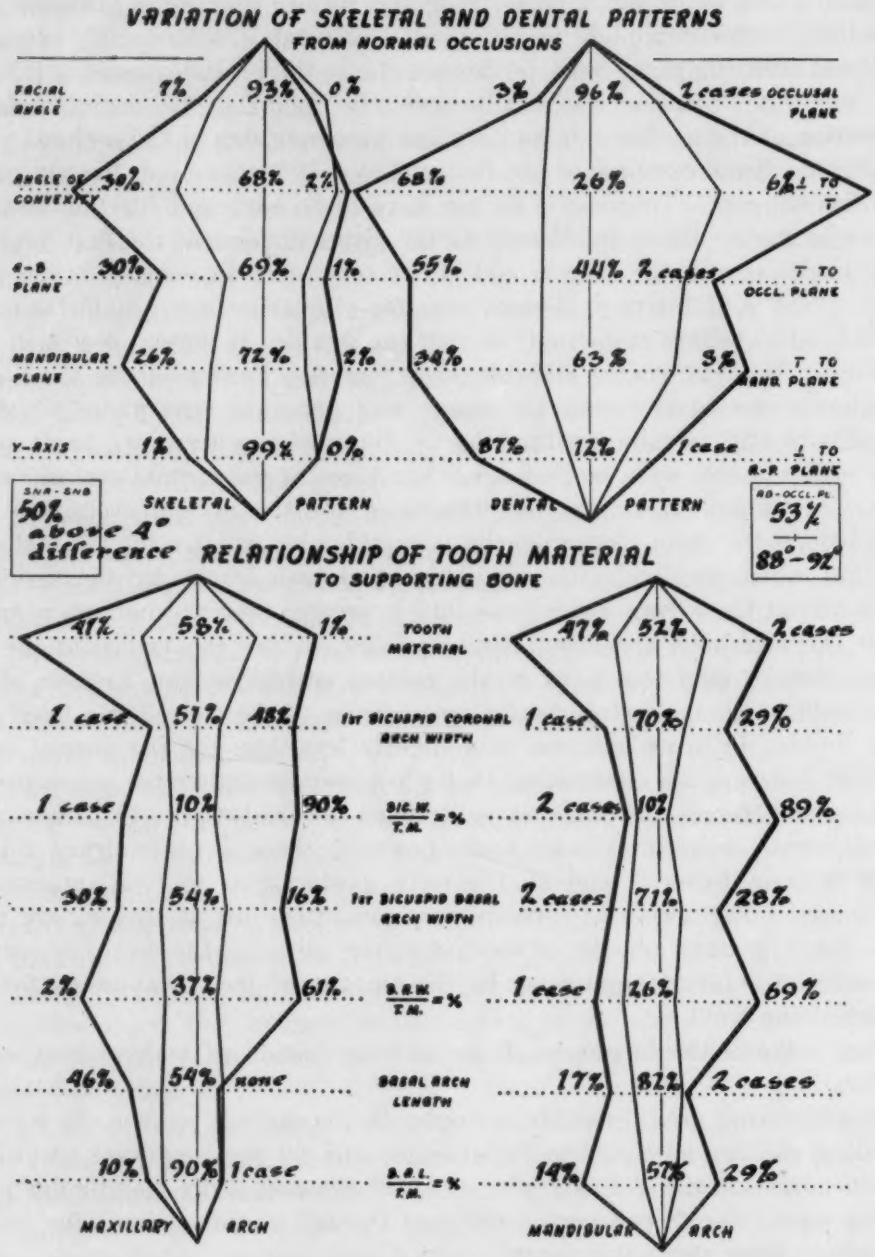

Fig. 3.—The incidence of the various factors of malocclusion.

minimum. In 55 per cent of the cases the mandibular incisors tipped too far forward in relation to the occlusal plane, while in 34 per cent of the cases the mandibular incisors were too procumbent in relation to the mandibular plane. In 87 per cent of the malocclusions, the maxillary incisors protruded excessively. Protrusion of incisors is due to poor muscular balance, and so we have 87 per cent of the cases showing poor muscular balance.

In the SNA-SNB difference (left-hand box), one-half of the cases had a difference of 4 degrees or more.

In the AB-occlusal plane angle, 53 per cent were within 2 degrees of being perpendicular. In good occlusions the AB line is either perpendicular to the occlusal plane or the "B" point is slightly forward of the "A" point.

In the tooth material-arch dimension patterns (two lower polygons), 41 per cent of the cases had excessively large maxillary teeth and 47 per cent had excessively large mandibular teeth. Here is another bit of evidence indicating disharmony in maxillary and mandibular tooth material, with the mandibular teeth being too large for the maxillary teeth in a number of cases. Forty-eight per cent of the cases had less than minimum maxillary first premolar coronal arch width, and 29 per cent had less than minimum coronal arch width in the mandible. It should be borne in mind that these are actual millimeter measurements being compared with similar measurements of normal cases, which had smaller teeth.

The coronal arch width required for any case depends on the size of teeth. Because the malocclusion cases had larger teeth, they required larger arches. When the amounts of tooth material are taken into consideration, 90 per cent of the cases of malocclusion were found to be deficient in premolar arch width. Regardless of facial pattern, this is the major cause of crowded teeth and dental irregularities.

Maxillary basal arch width was less than the minimum normal measurement in 16 per cent of the cases, while mandibular basal arch width was less than the normal minimum in 28 per cent of the cases; however, because of large teeth, the percentage relationship of basal arch width to tooth material is less than minimum in a much higher percentage of cases—61 per cent of the maxillary arches and 69 per cent of the mandibular arches. A number of these were close to the border line so, unless one is convinced that expansion has no place in orthodontics, it appears that 20 per cent of the cases with narrow coronal arches of the permanent dentition could be treated by expansion. This is the difference between the number of cases deficient in coronal arch width and those deficient in basal arch width. This is using only minimum requirements as a guide. However, it is sometimes possible to move the teeth distally into a wider part of the bony support and, while this does not actually increase the width of the basal arch, it has the same effect in creating support for the teeth.

As was pointed out previously, basal arch length in the maxilla seems to be adequate if the normals used are a fair guide. It seems strange that 46 per cent of the cases of malocclusion had greater basal arch length than the

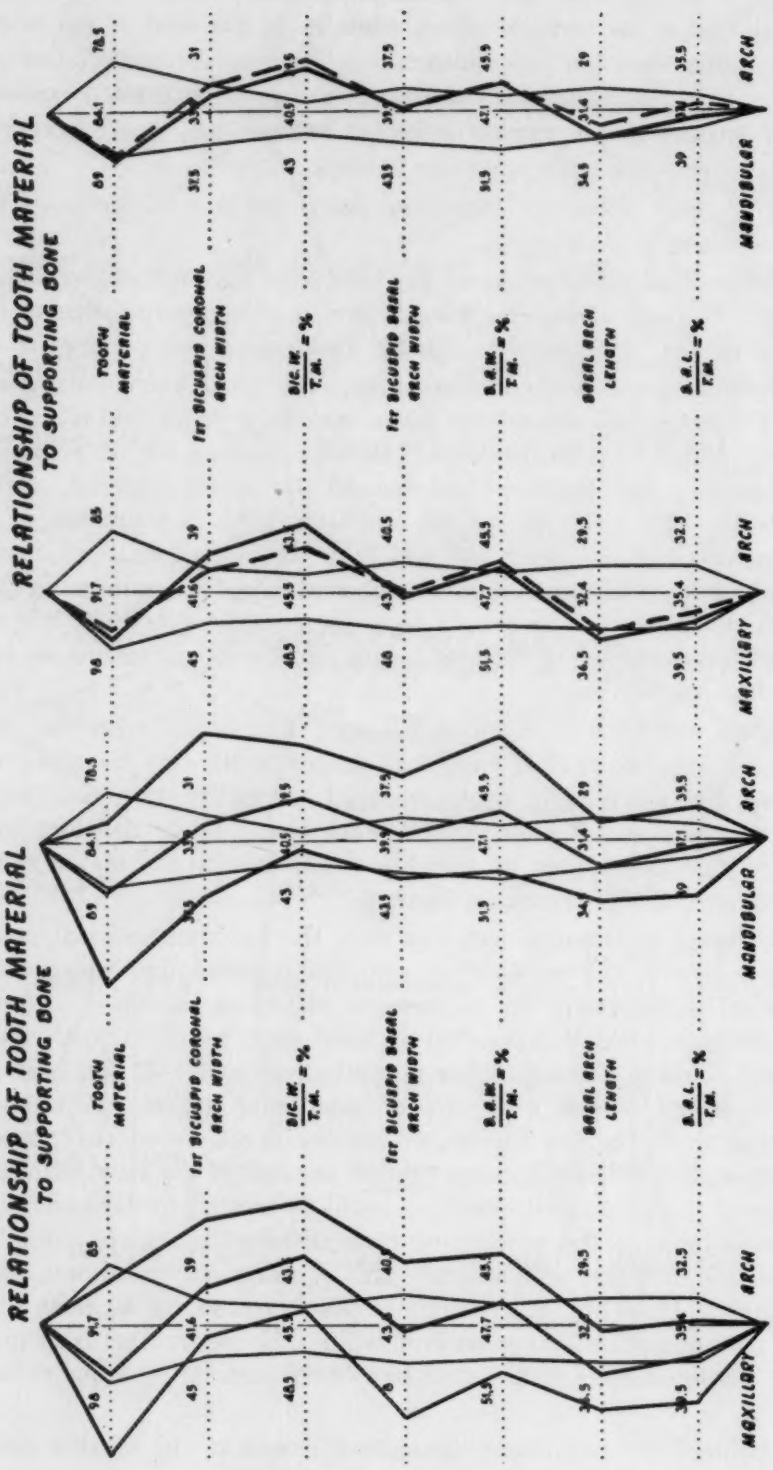

Fig. 4.

Fig. 5.

Fig. 4.—Range of variation and mean of tooth material and arch dimensions of eighty-seven mixed dentitions (heavy line).

Fig. 5.—Comparison of means of arch dimensions of permanent and mixed dentitions. Heavy solid line represents mixed dentitions; broken line represents permanent dentitions.

normal cases measured and, even when their large teeth are taken into consideration, 10 per cent of these figures were greater than the maximum figure obtained for the normal occlusions.

In the mandible, 29 per cent of the cases were too short for their amount of tooth material if the normal sample can be used as a guide. The foreshortening in a number of the cases was due to premature loss of deciduous teeth through either extraction or the premature exfoliation of deciduous teeth.

Mixed Dentition.—The casts of eighty-seven mixed dentitions were measured, and the range of tooth material and arch dimensions is shown in Fig. 4. Notice the high average of tooth material and the swing to the deficient side in the first deciduous molar width.

The percentage of relationship of coronal arch width in the first deciduous molar area to tooth material is below minimum for normal occlusions in 99 per cent of the maxillary arches and 95 per cent of the mandibular arches. These figures are slightly higher than were those of the permanent dentitions, so there must be some improvement in coronal arch width in the premolar area in a small percentage of cases. It seems significant that basal arch width in the mixed dentitions is less than the minimum requirements in only one half of the cases. Thus, nearly one half of the mixed dentition cases are narrow in the coronal arch region, but not in the basal arch dimension. (It might be assumed that this coronal constriction is not due to heredity, but to muscular imbalance which prevents the widening of the coronal arch. Even if this is true, will expansion at this time be attended with a rebalance of muscular forces, or is relapse inevitable? Can the natural tendency toward coronal widening as the premolars erupt be augmented by orthodontic therapy? For years orthodontists have been showing the results of early treatment, which generally consisted of arch expansion. Further evidence of the results of such expansion combined with extraoral force driving backward against the molars, to maintain arch length, will be presented later.)

A comparison of means of the permanent and mixed dentitions (Fig. 5) shows that the mean arch width for the permanent dentitions has improved over the mean arch width of the mixed dentitions. The broken line represents the mean for the permanent dentitions and the solid line represents the mean for the mixed dentitions. Basal arch width is slightly less for the permanent dentitions than for the mixed dentitions. Maxillary basal arch length is 1.4 mm. less in the permanent dentitions than in the mixed dentitions, while mandibular basal arch length is 1.7 mm. less in the permanent dentitions. These figures represent the average amount of forward migration of the first molars when the deciduous molars are lost.

The initial intention of this investigation was to see if there was any relationship between these all-important arch dimensions and the profile facial pattern. Do good faces, that is, faces with profile patterns within the normal range, have better arches and more room for the teeth? A chart was made comparing the range of variation of cases with good facial patterns, according to Downs with the range of variation of those whose faces fell outside the

Downs pattern (Fig. 6). The solid line represents the limits of variation of cases with poor facial pattern and the broken line indicates the variation of cases with good facial pattern. While the cases with the poor facial patterns contained the extremes of both Class II and Class III cases and was, therefore, too all-embracing, they are of some interest. In skeletal pattern, the deviation from the normal in the recessive or Class II face is much greater than it is in the Class III face.

In the dental pattern there was a greater range of variation in the cant of the occlusal plane in those cases with poor facial patterns. In the cases with good facial patterns, the range of the angle of the occlusal plane was the same as for Downs' normal occlusions. While there is no definite correlation, the cant of the occlusal plane tends to become steeper as the mandibular plane angle becomes steeper, but to a lesser extent. In other words, the mandibular plane angle varies 26 degrees from the steepest to the flattest, while the cant of the occlusal plane varies 16 degrees from the steepest to the flattest.

It is surprising to note the similarity in the extreme limits of procumbency of the incisors in cases with good and poor facial patterns. This would lead one to credit this procumbency primarily to muscular influence and not to facial pattern.

In the tooth material–arch dimension charts, the extreme measurements of the cases with poor facial patterns showed larger teeth and more constricted coronal basal arches in the maxilla. Mandibular coronal and basal arch width deficiency was as extreme in one as in the other.

So much attention has been focused on the importance of the Frankfort-mandibular plane angle in orthodontics that it was decided to compare cases with plane angles of 22 degrees or less with those which had plane angles of 28 degrees or more.

The extremes of these cases will not be shown, but the mean shows the trend (Fig. 7). There were thirty-two cases with plane angles of 22 degrees or less (broken line) and thirty-eight cases with angles of 28 degrees or more (solid line). The average plane angle of the flat plane group was 18.5 degrees and of the steep plane group 31.8 degrees. The cases with steep planes are generally much more convex in skeletal profile. The ANB angle is greater in the steep plane cases and AB-occlusal plane angle is farther from the normal. The mean occlusal plane angle of the steep plane cases was 5.5 degrees greater than that of the flat plane cases. Here again is seen the correlation between mandibular plane angle and the occlusal plane angle. The incisors are more procumbent in the steep plane cases but, because of the steep plane, the mean angle of the mandibular incisor to the mandibular plane was less.

In tooth size and arch dimensions, the steep plane cases generally had larger teeth, narrower arches, and shorter arches.

This would account for the higher percentage of extractions in the steep plane cases. However, other skeletal factors often associated with a steep mandibular plane may be, and probably are, of greater importance than the mandibular plane itself in producing shorter and narrower arches. It makes a great difference in the amount of room that there is for the teeth if the steep

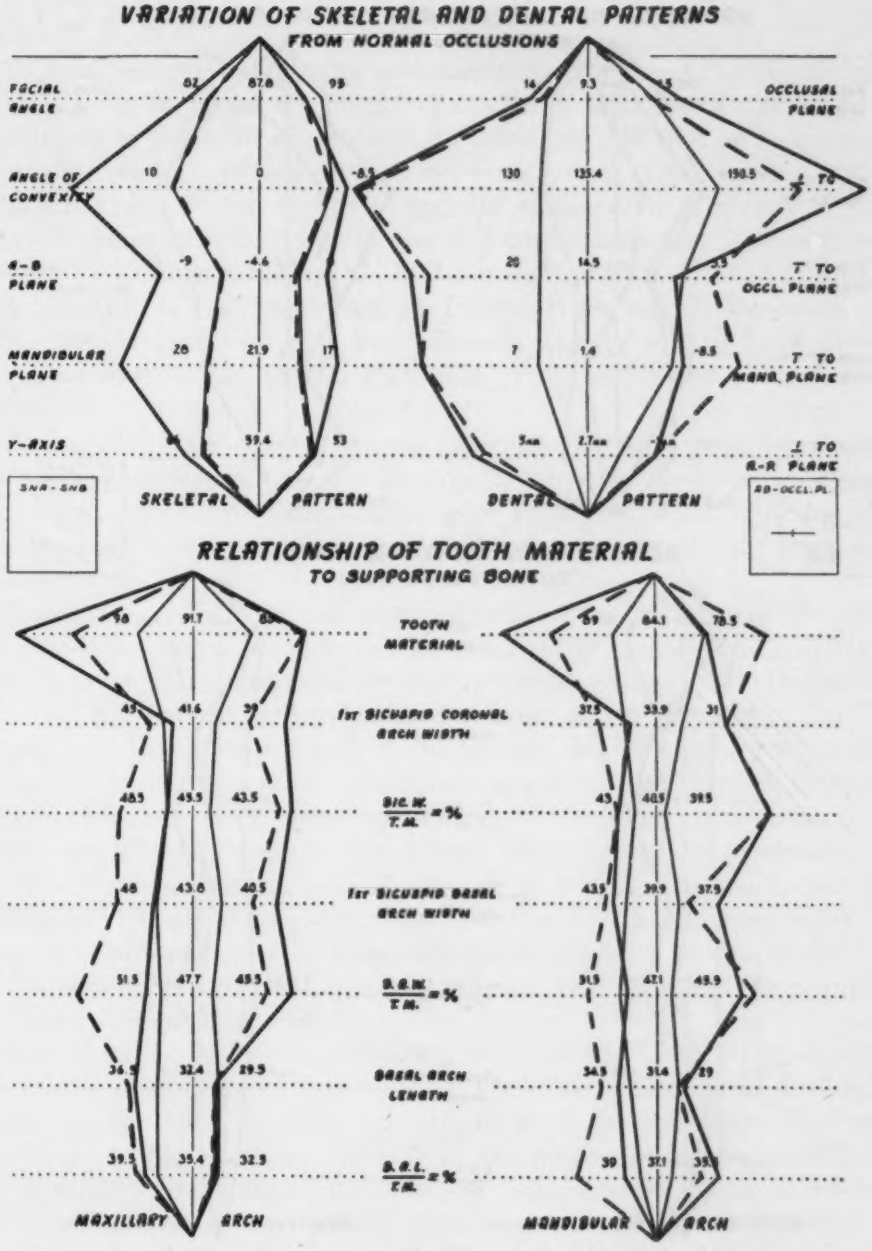

Fig. 6.—Comparison of limits of variation of cases with good (broken line) and poor facial patterns.

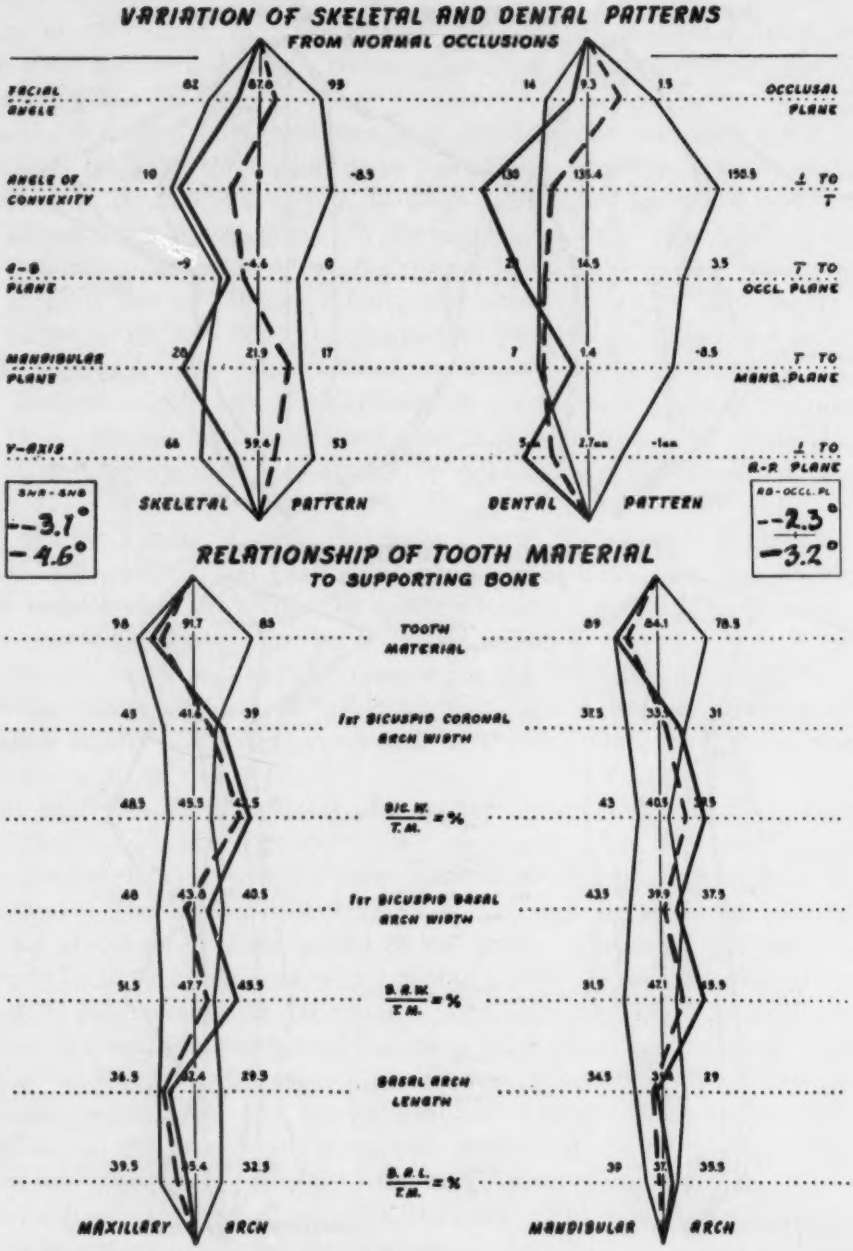

Fig. 7.—Comparison of means of cases with mandibular planes of 22 degrees or less (broken line) and cases with mandibular planes of 28 degrees or more (heavy line).

plane is due to a short ramus, which is often combined with a short body of the mandible, or if the ramus height is normal and the steep plane is due to increased height at the symphysis.

DISCUSSION

If it is true that inadequate arch width for the amount of tooth material is the major cause of dental irregularity, what is the orthodontist to do about it? Phrased in different ways, this is the same question that orthodontists have been trying to answer for the past fifty years. One of the reasons that there is a disagreement in the answer is that the cause of the disparity is still obscure. We know what is wrong, but we still do not know why, although volumes have been written on the subject. Is it nature or nurture, or a combination of both? Brash,[5] in his "Aetiology of Irregularities and Malocclusion of the Teeth," quotes from Professor Wood Jones's "Arboreal Man." In the quotation, Jones is referring to the shortening of the snout and the reduction of the number of teeth.

Jones says: "We can sum up the last phases of the process by saying that if primitive and natural man has no gaps between his adult teeth, his children always have gaps between the smaller teeth of their first set; but the children of modern and civilized men are losing even these gaps with the shortening of the jaws."

Brash then adds: "From this quotation it is sufficiently obvious that Professor Wood Jones, at least, is not in any doubt that crowding of the teeth in the jaws is of an evolutionary and inherited nature. We therefore conclude that the jaws have been reduced relative to the rest of the skull; that the teeth also have been reduced in number and size; that the jaws as a whole have been reduced more than the teeth; and that the reduction of the jaws has been principally in the alveolar portion, especially in its anterior part, so evidenced among other things by the relative reduction of the premaxilla.

"The question now at issue is whether by the mechanism of evolution as it effects the jaws and the teeth, whatever that mechanism may prove to be, a disproportion amounting to a positive disharmony can be the result."

In these quotations, both Jones and Brash seem to stress the reduction of arch length rather than width.

The statistics in this investigation indicate that arch width is more at fault in the production of malocclusion, but all will agree that the teeth are too big for the arches or the arches are too small for the teeth. The common occurrence of this condition, as well as the reverse condition, namely, small teeth and large arches, seems to indicate a lack of coordination in the inheritances of these two factors. It would seem, then, that the simplest solution, from a theoretical viewpoint, is to reduce the amount of tooth material in those cases with large teeth and narrow arches. But are we ready to accept this as the only solution? Have all the children with irregular teeth achieved their maximum potential arch size and, if they have not, can orthodontics help them achieve it? We know that in a high percentage of cases adverse muscular forces are present. Must they always remain so? What about expansion?

Is it always doomed to failure? Is it a procedure that has been proved futile by the past fifty years of orthodontic treatment? Is that evidence conclusive, or merely misleading? If expansion has a place in orthodontic treatment, is it a very small place, in a small percentage of cases? Why not extract? Does extraction eliminate some of the uncertainties of our treatments, only to add others? Are we ready to accept extraction as the only solution? These are some of the questions that should be answered before the entire profession jumps on the bandwagon, bearing the banner "Extraction for All, and All for Extraction."

In the conclusions of a previous article,[6] I stated: "A normal occlusion must be supported by a normal apical base. Mechanical orthodontic therapy cannot directly affect the size of the apical base. Indirectly, by making possible normal muscular action in breathing, chewing, swallowing, facial expression, etc., it seems plausible that the apical base would be given an opportunity of achieving more normal dimensions, although I have been unable to obtain evidence to substantiate such an assumption."

Following a desire to examine further the possibilities of arch enlargement by means of expansion *plus a distal extraoral force*, I confess that I have leaned over backward in avoiding extraction, even preserving a full complement of teeth, when the tooth and arch measurements indicated that the tooth material should be reduced. The patients and their parents are prepared for some eventual irregularity of the mandibular incisors.

Early expansion of the deciduous dentition or the mixed dentition would seem to produce the best results in this effort to avoid extraction. Granted, in normally developing dentitions, coronal and basal arch width in the first deciduous molar area is as great as it will ever be. Sometimes it is greater. But in a great many cases this lateral growth fails to occur. If this failure is attributed to heredity, then expansion would seem to be futile. It is futile in some cases, but in others it is not. It would appear that, through some inhibition, the full growth potential had not been reached, and in those cases not only the coronal arches, but the basal arches as well, can be expanded. When a child has oversized anterior teeth, rotated and overlapping, and narrow coronal and basal arches in the first deciduous molar area, with small bizygomatic and bigonial measurements, the possibility of permanently gaining space for the anterior teeth is slight or nil. However, when the profile facial pattern is good, the bizygomatic and bigonial measurements are favorable, and the basal arch width is greater than the coronal arch width, expansion is indicated. This is particularly true if the basal arch is wider than the coronal arch; 50 per cent of the mixed dentitions measured were not deficient in basal arch width.

CASE REPORTS

Case 1869 (Fig. 8), a distoclusion case, was treated by expansion of the maxillary arch, plus extraoral retraction and intermaxillary force. The change in the maxillary coronal and basal arch width is obvious.

The chart (Fig. 9) shows how much expansion was achieved. The basal arch is 6.5 mm. wider above the premolars than it was above the first deciduous molars, and the coronal arch width between the summits of the buccal cusps of the first premolars is 11.0 mm. wider than the same measurement between the first deciduous molars. The mandibular plane angle is slightly outside the pattern. Some crowding of the mandibular anterior teeth is to be expected, as the mandibular arch was foreshortened by the intermaxillary force.

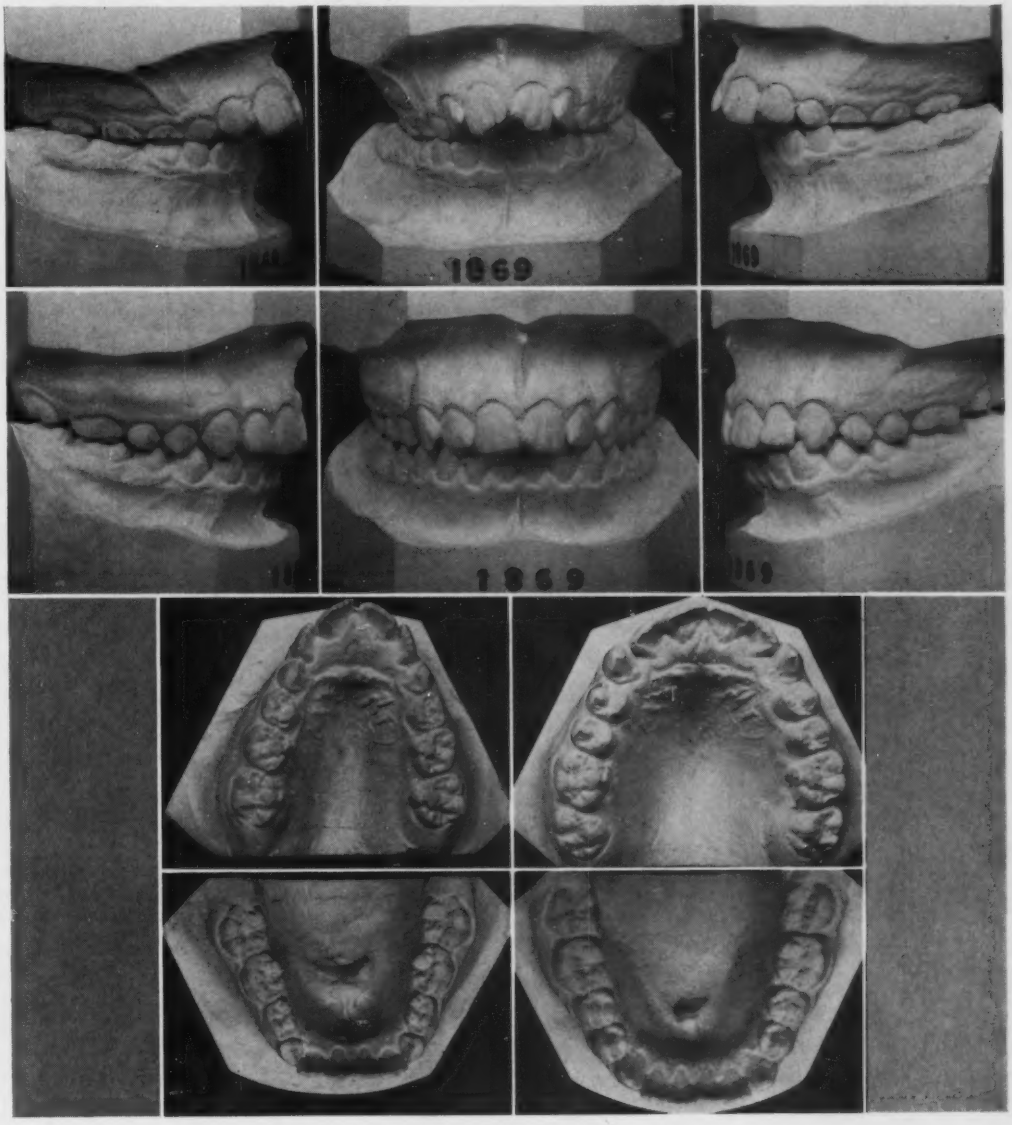

Fig. 8.—Case 1869. Casts of mixed dentition before and after treatment, showing great amount of expansion in premolar and molar region.

Photographs taken after treatment (Fig. 10) show good bizygomatic and bigonial width. The original narrowness of the maxillary arch was probably due to adverse muscular pressure.

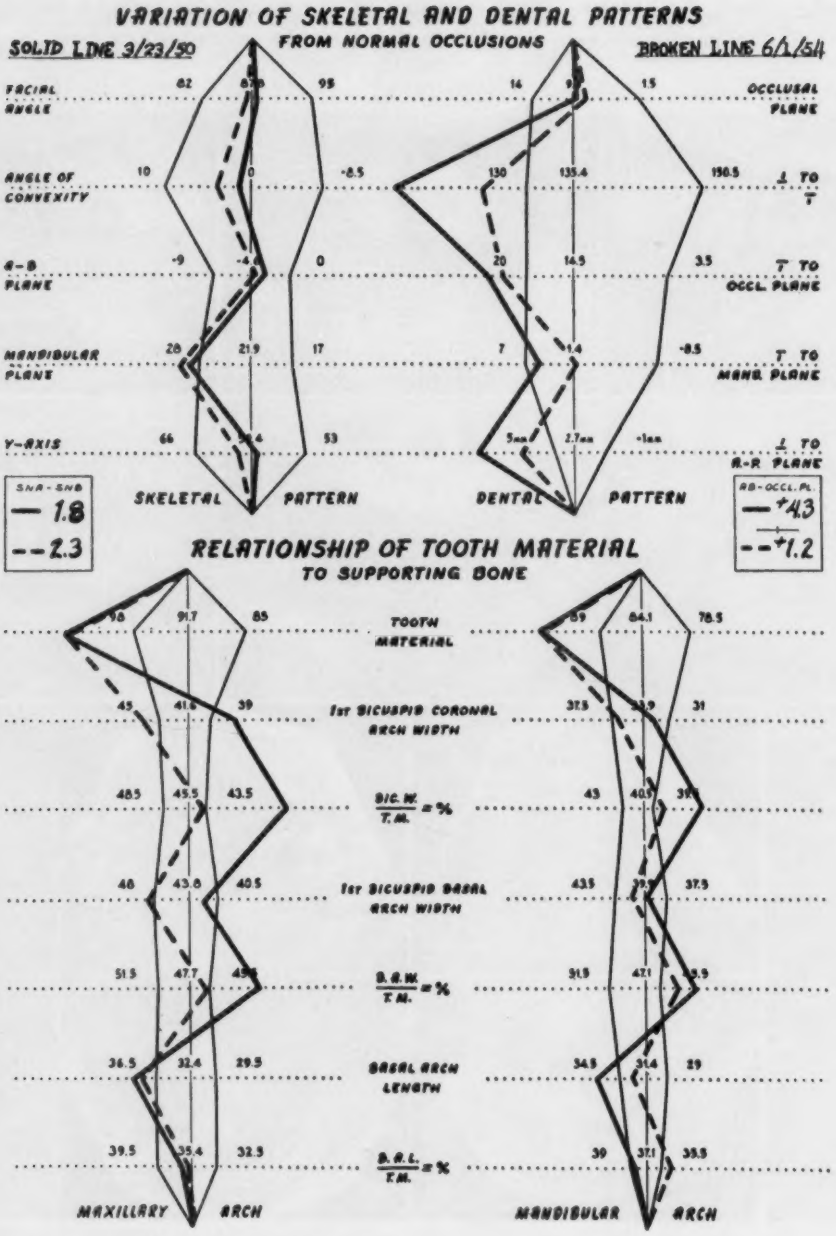

Fig. 9.—Chart of Case 1869 showing change in arch dimensions.

Case 1776 (Fig. 11) was another in which a distoclusion was treated in the mixed dentition; this case showed arch expansion in the finished result. Extraoral retraction was used, along with expansion. At one phase of the treatment, light intermaxillary force had to be used to assist the extraoral force in bringing about the desired mesiodistal correction. Inasmuch as the arches are normally longer in the mixed dentition than in the permanent dentition, the judicious use of intermaxillary force, if it is necessary, is probably less damaging to the mandibular arch at this time than it is after all the permanent teeth have erupted and the normal mesial migration of the first molars has taken place.

The photographs of the girl before and after treatment show mandibular growth and improvement in muscular balance (Fig. 12).

Case 1787 (Fig. 13) presented a diminutive deciduous dentition in distoclusion, with the anterior teeth crowded together instead of spaced. Two factors encouraged the decision to expand these arches. The boy had good facial width, as did his mother and father. His mother had an excellent dentition; his father had slight mandibular crowding. His mother, who had been a patient as a girl, was kept under observation but never treated. Her arches expanded naturally at an early age, both coronal and basal arches being wider in the mixed dentition than they are at present in the permanent dentition. Here is a case in which, if family background is ignored, the chances of avoiding eventual extraction would appear slight and serial extraction might be considered.

Fig. 10.—Photographs of Case 1869 showing good bizygomatic and bigonial width.

The second set of casts (Fig. 14) shows the change after the initial expansion. At this stage extraoral retraction was started and continued during the period that the premolars were erupting.

The third set of casts (Fig. 13) show the case in its present stage. No appliance has been on the maxillary arch for more than two years, but a mandibular lingual arch has been in place to widen the premolar area as these teeth erupted.

I believe that there will be some ultimate irregularity of the mandibular incisors, but it looks as if it will be a satisfactory occlusion, with little or no irregularity of the maxillary incisors. There has been a 9.5 mm. expansion of the coronal arch in the premolar area, and

a 7.0 mm. enlargement of the basal arch above this region. The arch is 8.0 mm. wider in the first molar area. I believe that it is safe to assume that no such development would have taken place without orthodontic treatment. Apparently there was no basic disparity between tooth size and arch size, that is, potential arch size. The problem is to know what the potential may be. Family characteristics and facial width are two factors to be considered in making this decision. In other words, we are back to the old question of which of the constricted arches are due to inherited size and which to environmental restrictive forces.

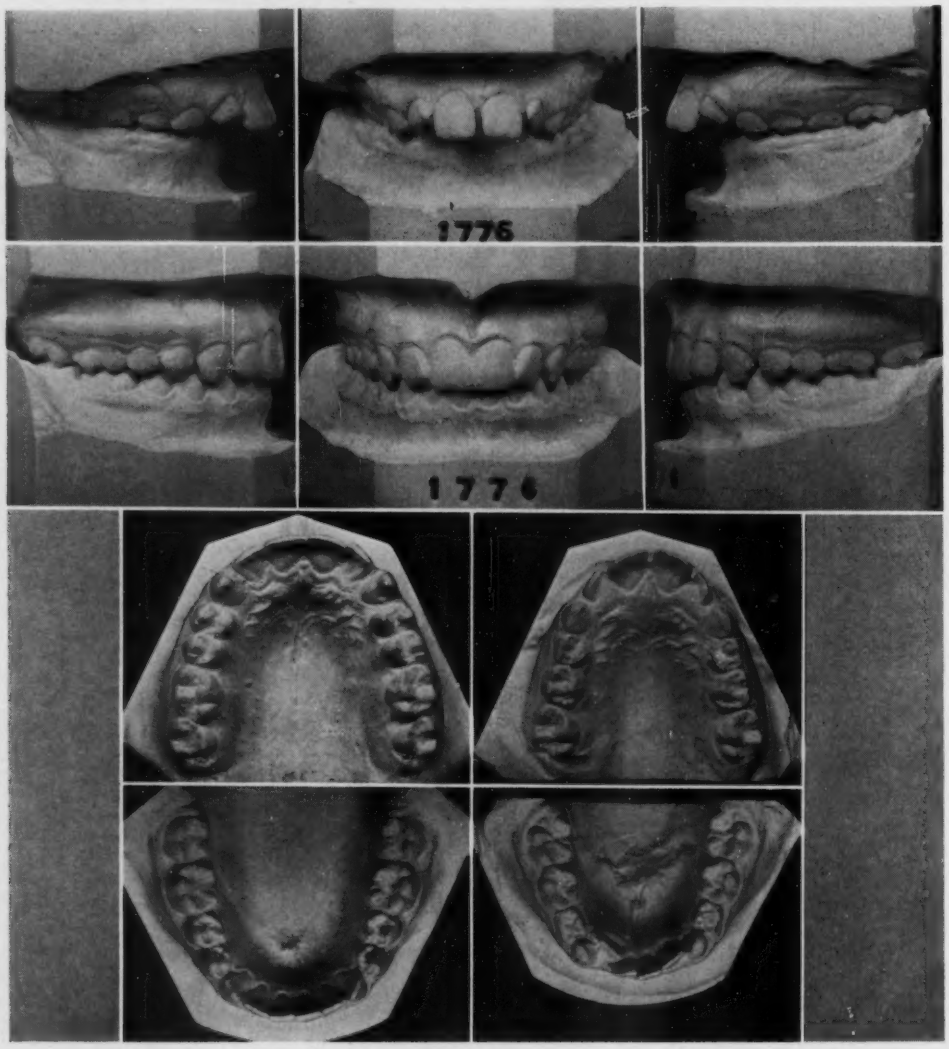

Fig. 11.—Case 1776. Casts before and after treatment of mixed dentition distoclusion showing expansion in premolar and molar region.

In a previous article[7] it has been pointed out that when the basal arches are wide enough, but the coronal arches are not, the coronal arches can be expanded, and if the environmental forces which would cause relapse are eventually eliminated by further growth, elimination of habits, or a new balance of muscular forces, then the expansion will be maintained. According to the figures previously shown, this might apply to about 20 per cent

of our cases. At that time it was also suggested that, by moving the teeth distally into a wider part of the arch, greater arch width could be gained. Some evidence is now at hand which confirms this assumption.

In many of our early treatments by expansion, insufficient efforts were made to maintain the full length of the mandibular arch and thus, as the arches became wider, the mandibular arch became shorter. Hence, there was no net gain in space for the irregular teeth, and often there was a net loss of space, if intermaxillary force had been used.

Fig. 12.—Photographs of Case 1776 showing mandibular growth and improvement in muscular balance.

Fig. 15 presents an example of such a treatment (Case 2506, before and after treatment). The coronal arches were expanded, but the mandibular arch foreshortened nearly 5 mm; which would mean a 10 mm. loss of space for the teeth, the buccal teeth having moved forward 5 mm. on each side. As only 5 mm. was gained by expansion, there was a net loss of 5 mm. of space for the teeth, which accounts for the irregularity of the mandibular incisors.

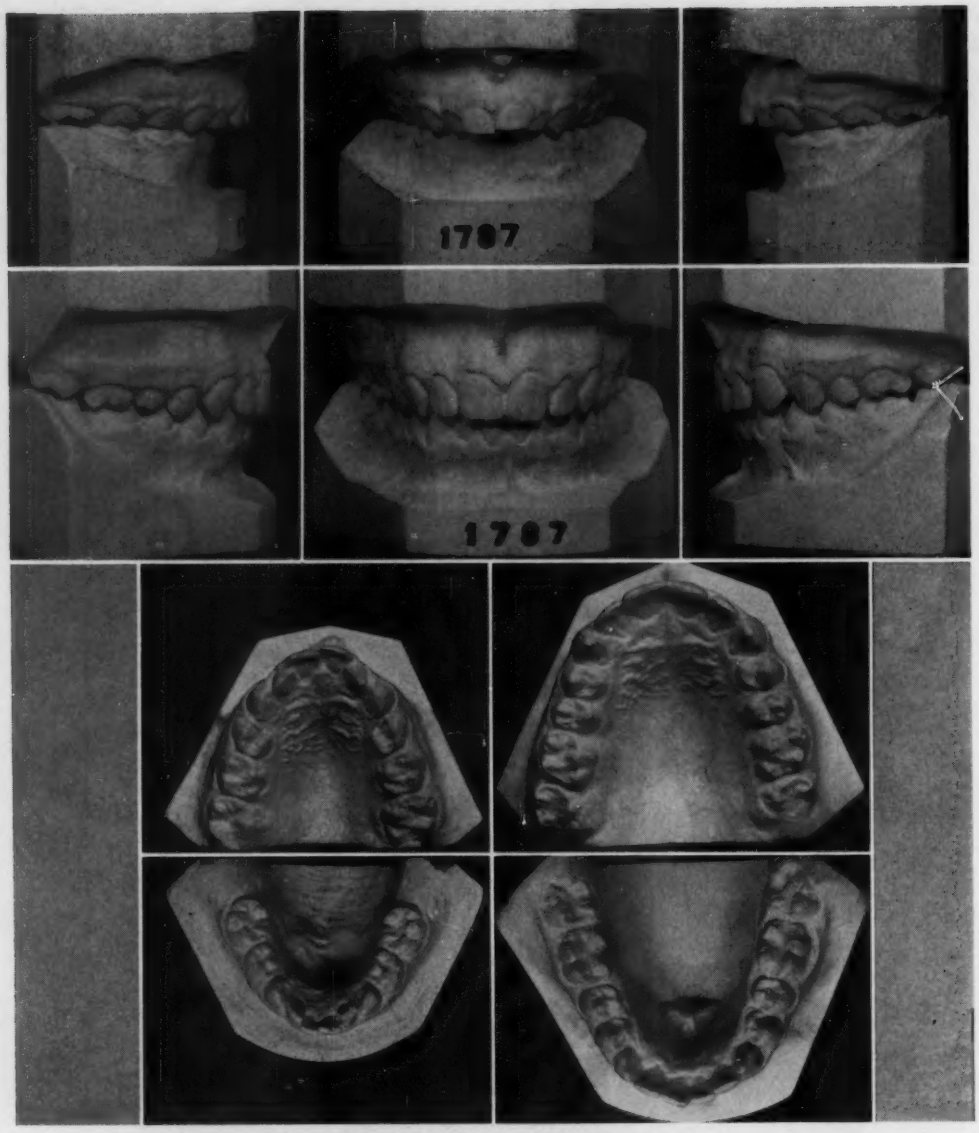

Fig. 13.—Case 1787. Casts before and after treatment showing results of expansion combined with extraoral force. Treatment started with deciduous dentition. Maxillary coronal arch width increased 9.5 mm. in premolar region and 8 mm. in first molar region. Maxillary basal arch width above first premolars is 7 mm. wider than above first deciduous molars. Mandibular coronal arch width increased 8 mm. in premolar region; basal arch width increased 4.5 mm.

Fig. 14.—Case 1787 after initial expansion of deciduous dentition.

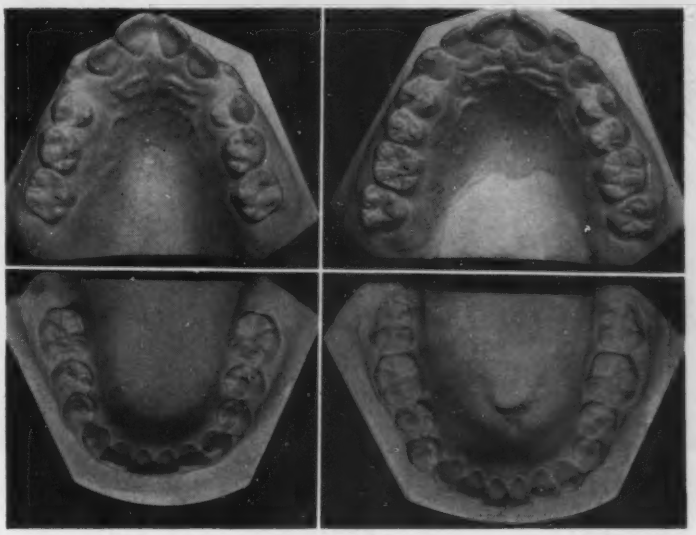

Fig. 15.—Case 2506 showing expansion and loss of mandibular arch length with crowding of incisors.

Case 2129 (Fig. 16) was treated with extraoral force on the maxillary arch and reverse, or Class III intermaxillary elastics. No teeth were extracted. The arches were wider at completion of treatment and the upper and lower anterior teeth have been tipped lingually.

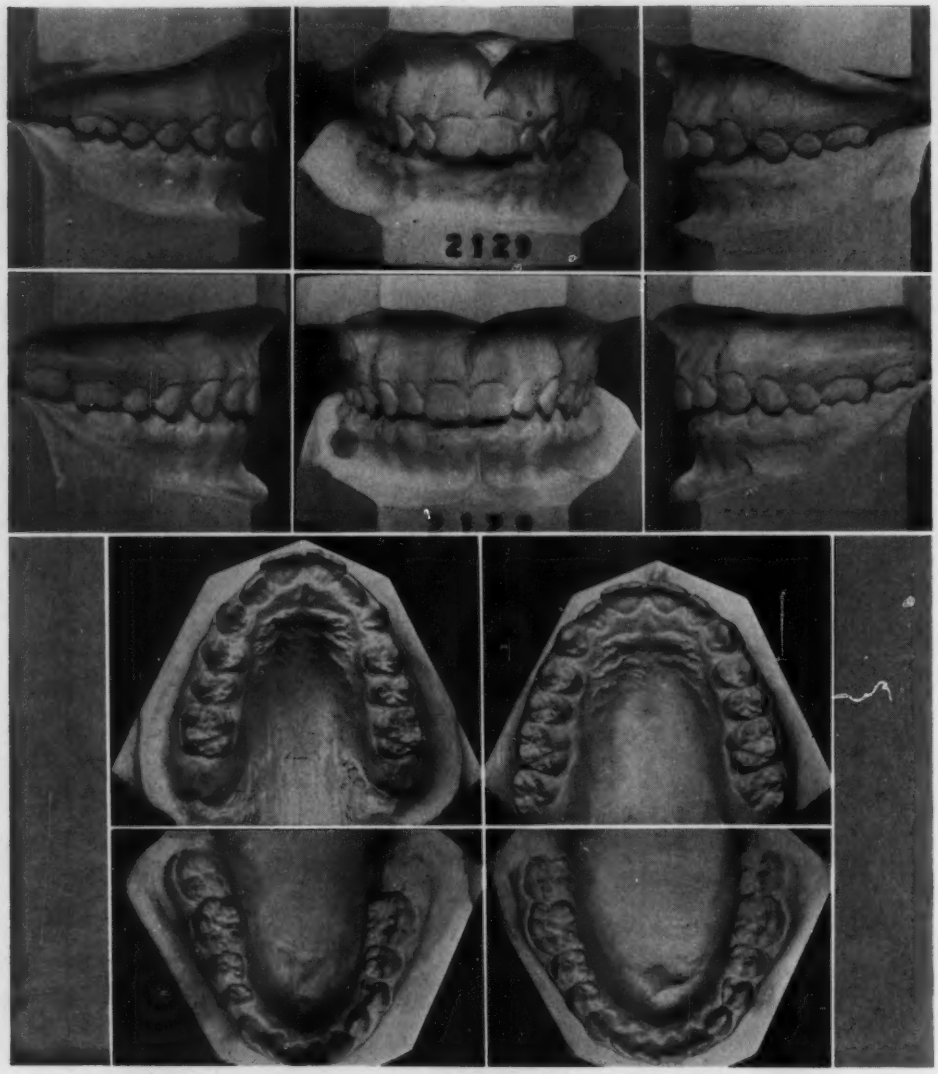

Fig. 16.—Case 2129. Expansion of permanent dentition. Extraoral retraction and reverse intermaxillary elastics were used in combination with an expanding force.

The chart of Case 2129 (Fig. 17) before and after treatment shows that premolar width has increased 7 mm. Arch length has also been increased, both maxillary and mandibular basal arches being 2 mm. longer after treatment.

It should be noted that the mandibular plane in this case is over 28 degrees, slightly above Downs' high range of normal, but there is only a 2 degree difference in the SNA-SNB angles, and the AB plane is perpendicular to the occlusal plane. If there had been a large ANB angle and the "B" point had been posterior to the "A" point in relation to the occlusal plane, this treatment would not have been attempted.

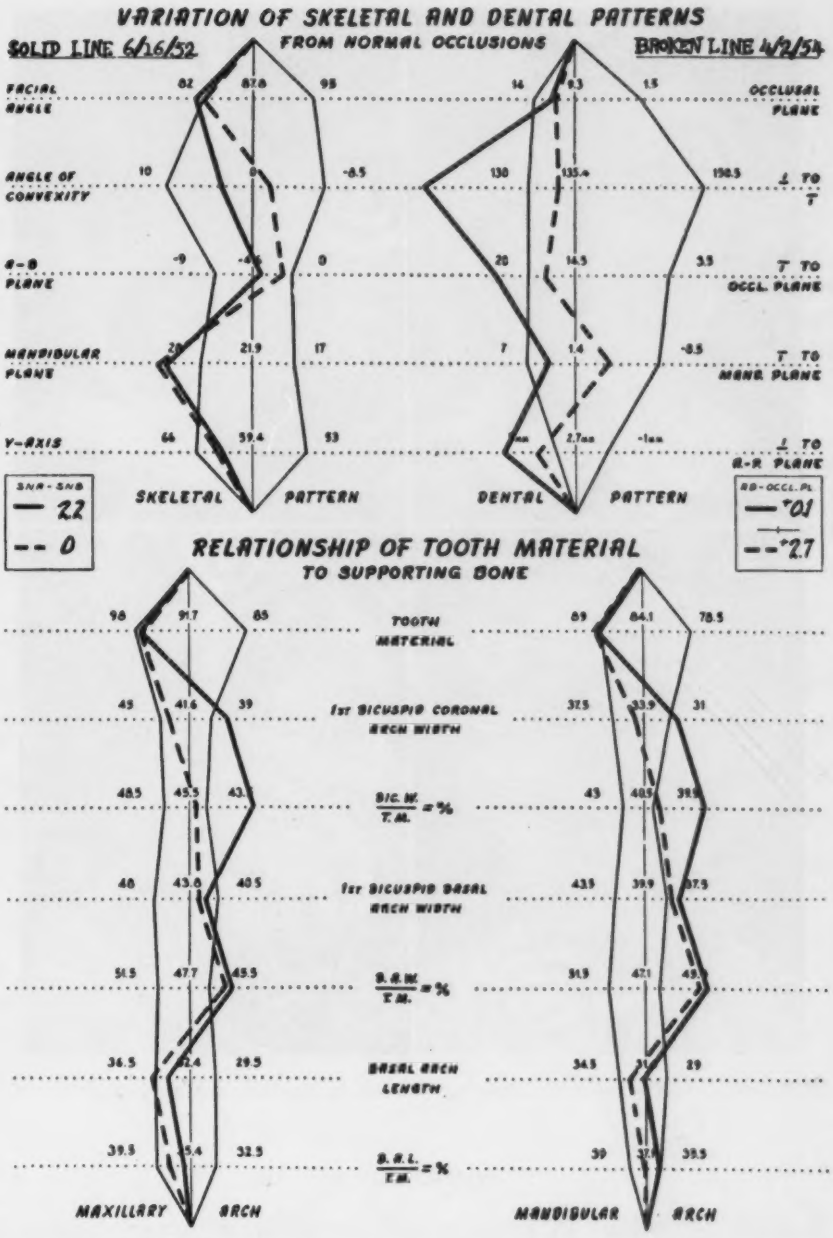

Fig. 17.—Chart of Case 2129 showing retraction of both upper and lower anterior teeth, widening of arches in premolar region, and lengthening of both maxillary and mandibular arches. Heavy line = before treatment. Broken line = after treatment.

The photographs of the girl before and after treatment (Fig. 18) show the change in the prominence of the lips.

Fig. 18.—Photographs of Case 2129 showing change in lip line due to retraction of anterior teeth.

CONCLUSIONS

1. A high percentage of persons with irregular or crowded teeth have a greater-than-average amount of tooth material.

2. A still higher percentage of such persons have less-than-average arch width in the premolar region.

3. Nearly all persons with crowded teeth have insufficient arch width in the premolar area in proportion to their tooth material.

4. Nine out of ten persons with malocclusion have abnormal balance of the musculature which surrounds the denture, producing procumbency of the anterior teeth and possibly influencing arch width in the premolar area.

5. By taking advantage of additional anteroposterior growth through the use of an extraoral retractive force, it is possible to move the teeth distally or hold them back while forward growth occurs. In either case, additional basal arch width is afforded for support of the teeth.

6. Increasing arch width is more feasible when treatment is started in the deciduous or mixed dentition and continued through the period in which the premolars erupt.

7. There would appear to be some correlation between arch width and length and the mandibular plane angle, those persons with steep planes generally having narrower and shorter arches. This correlation may be only coincidental, with other skeletal factors often associated with the steep mandibular plane being of greater importance than the mandibular plane itself in producing narrower, foreshortened arches.

8. Sound orthodontic judgment of the immeasurable factors involved in malocclusion remains the prime requisite in making decisions as to whether to attempt arch enlargement or to reduce the amount of tooth material by extraction.

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SOME FACTORS DETERMINING THE EVALUATION OF FORCES IN ORTHODONTICS

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WHILE in practice orthodontic forces are applied according to the skill and insight of the orthodontist, in experimental work on tooth movement it will be necessary to measure the forces applied. This has been done in studies on the tissue reaction by such authors as Schwarz,[9] Stuteville,[13] Skillen and Reitan,[10] Moyers and Bauer,[5] Reitan,[6, 7] and Huettner and Young.[3a] More recently, other investigations have considered the mechanics involved and the distance through which the teeth were moved as related to the time and force factors.[3, 11, 12, 14]

Very few investigators include a comparison of histologic findings and, on the other hand, the variation in the degree of tooth movement as related to the amount of force applied. This is due chiefly to the complexity of the problem. This problem includes various factors, each requiring a special study, and the whole subject can hardly be covered in one short article.

In the following an attempt is made to discuss some of the factors involved and, by a few examples, to illustrate the use and significance of correlating histologic findings with practical observations.

A closer investigation of the problem forces in orthodontics reveals that some of the main factors are (1) the individual variation in tissue reaction, (2) the type of force applied, and (3) the mechanical principles involved. It is found that these factors are closely linked together. They can be discussed separately only to a limited extent.

THE INDIVIDUAL VARIATION IN TISSUE REACTION

Some variation in tissue characteristics is found among persons of a similar age group.[2] It has been shown, furthermore, that considerable variation exists in the normal tissue characteristics between young and adult structures.[8] This is seen clearly in control material taken from the jaws of untreated subjects. In 12-year-old children a many-celled periodontal membrane, a bone crest lined with uncalcified osteoid tissue, and marrow spaces containing a loose fibrous tissue are found. In an adult between 30 and 40 years of age there are not so many cells in the periodontal membrane. Thick periodontal fiber bundles are observed, and along the inner bone surface there is a darkly stained resting line. Frequently no osteoid tissue and no osteoblasts are found.

From The Norwegian Institute of Dental Research, Oslo.

The consequence of these observations is of importance especially during the initial stage of tooth movement. When an orthodontic force is applied, one may note that it usually takes a certain period of time before the cells on the tension side begin to multiply and finally reach a proliferation stage favorable for further tissue changes. The time required for attaining this proliferation stage is dependent upon various factors, including the age of the patient. During this transitory, initial stage of tooth movement, it will be practical to apply light forces.

Adult structures especially will need some time to overcome the static condition mentioned above. While proliferation of new cells is initiated after one or two days in young persons, cell proliferation and formation of osteoid tissue do not start until after about eight days in adult structures. In both cases, nothing would have been gained by applying strong initial forces.

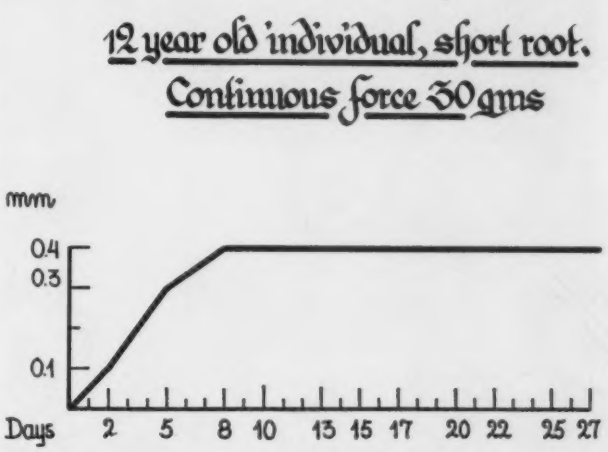

Fig. 1.—Graph indicating the days of measurement and degree of tooth movement. The tooth, an upper first premolar, had a short, not fully developed root. Duration of the cell-free area (nineteen days), is represented by the horizontal portion of the curve.

There is one special reason for applying light forces during the initial stage of tooth movement, namely, the tendency to formation of cell-free, hyalinized areas. Hyalinization of periodontal fiber bundles on the pressure side occurs more frequently during the initial stage than later on. This is caused partly by the density of the inner alveolar bone, along which extensive cell-free areas may be formed. The tendency to such formation decreases as soon as this compact bone plate has been eliminated by resorption.

In a great number of cases, formation of cell-free areas is unavoidable. As pointed out later in this article, this is found, for instance, in cases where the root of the tooth moved is short or undeveloped.

In a series of experiments performed with continuous forces, measurments were made of the force applied as well as of the distance through which the teeth were moved. A fairly exact estimation of the distance of labial

movement of an upper first premolar can be obtained by inserting occlusal amalgam fillings in the experimental tooth and the control tooth of the opposite side of the jaw. A tiny hole, drilled in each filling, should be made so as to fit the metal points of the calipers. Fig. 1, indicating the time and degree of movement, shows the sequence of events in such a case, where the continuous force was 30 grams. It is found that hyalinization remained for nineteen days, or as long as the experiment lasted. An area of the pressure side at the moment the experiment was finished is shown in Fig. 2. Hyalinized

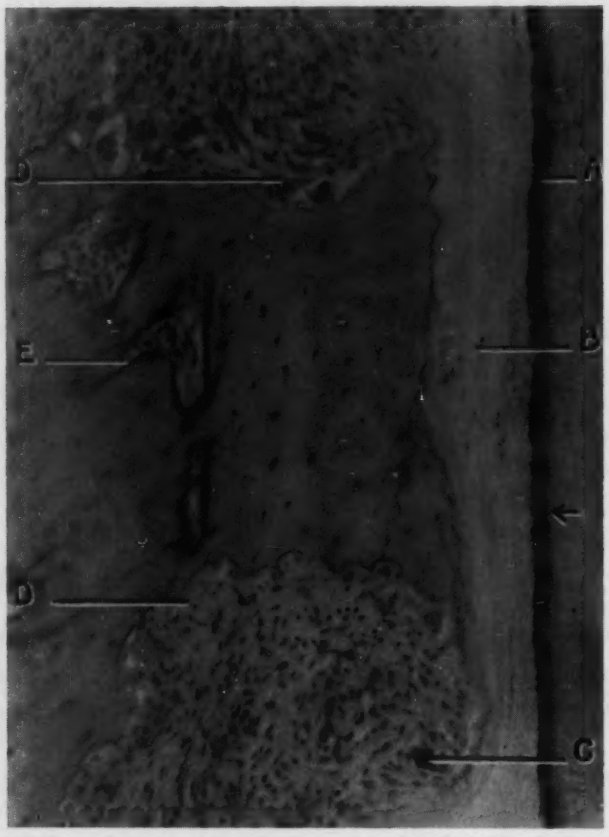

Fig. 2.—Marginal pressure area of an upper premolar with short root. The tooth was removed with some of the supporting structures after an experimental period of twenty-seven days. Degree of movement shown in Fig. 1. *A*, Cementum of root surface; *B*, hyalinized, compressed periodontal fibers; *C*, remaining osteoclast; *D*, indirect bone resorption with osteoclasts; *E*, marrow spaces.

fibrous tissue is not removed by osteoclastic resorption. Osteoclasts will remove the bone around the cell-free area. In this case bone resorption will continue for a few days more until the cell-free area is completely undermined. Then the tooth will suddenly move.

The degree of movement, also including a period after the cell-free area was undermined, is seen in Fig. 3. This tooth had a long root. Here hyalinization lasted for about two weeks. An area of the pressure side is seen in

Fig. 4. A considerable amount of new bone has been formed at the outer bone plate as a result of tooth movement. Hyalinized tissue is again reorganized and invaded by new cells. In general, light initial forces are desirable

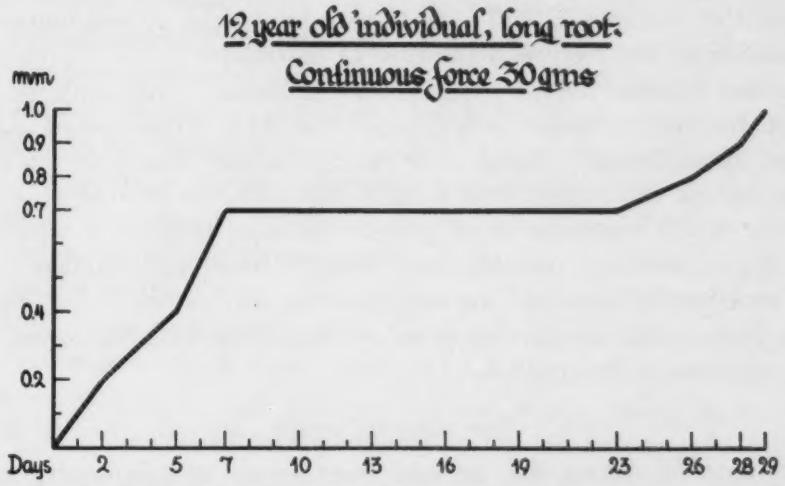

Fig. 3.—Graph indicating degree of movement of an upper first premolar with fully developed root. As indicated by horizontal portion of curve, a cell-free area persisted for about sixteen days.

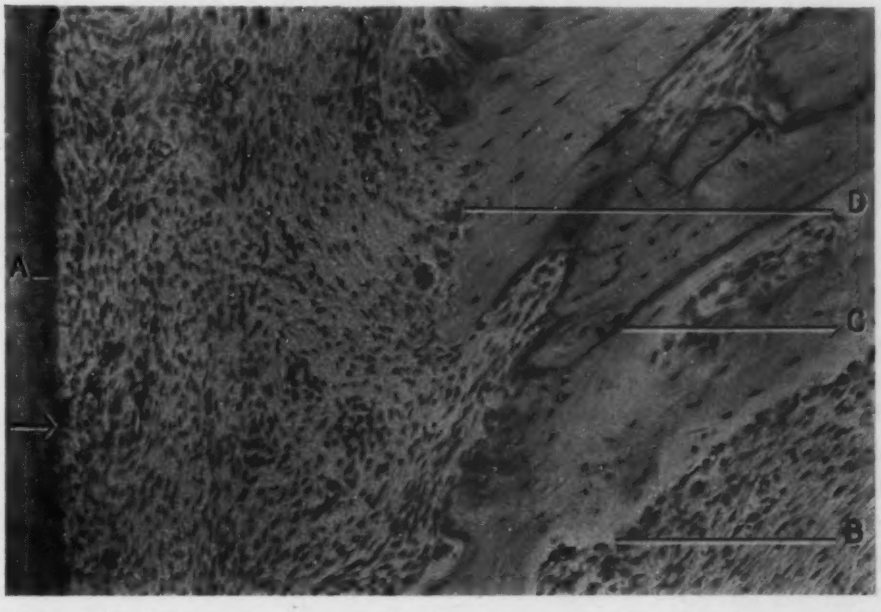

Fig. 4.—Marginal area of pressure side of an upper premolar, the movement of which is shown in Fig. 3. The cell-free area is again reorganized and invaded by a moderate number of cellular elements. *A*, Cementum of root surface; *B*, apposition of new bone along the outer surface of the bone crest; *C*, resting line; *D*, direct bone resorption along the inner bone surface.

in such cases, because the cell-free area will be less extensive and more readily invaded by cellular elements.

If the pressure is strong, new hyalinized areas will be created as soon as the initial cell-free area has been eliminated. In a continuous tooth movement

of individual teeth, it is practical to apply an initial force as light as around 25 grams in adults and around 40 grams in younger patients. After this first stage, the force applied for further continuous tipping of the tooth may be somewhat increased. This is justified (1) by the fact that stretched fibre bundles on the tension side will exert a certain amount of resistance and (2) by the position of the tooth and the type of movement.

This can be observed in experimental material. The tooth in the dog that most frequently causes direct bone resorption when moved labially is the second lower incisor. Direct bone resorption may take place on the pressure side because of the anatomic form of the root and because of its narrow position, by which compression of periodontal fibre bundles is avoided.

On the other hand, parallel movement between root surface and bone surface, occasionally observed during rotation, also causes direct resorption.

This leads to the second factor in evaluating orthodontic forces, namely, the type of force to be applied.

THE TYPE OF FORCE

Most authors distinguish between continuous and intermittent forces. A closer survey, however, calls for a further subdivision of these types. In addition to continuous forces, interrupted continuous forces must be included. Intermittent forces may be divided into removable appliances in general as distinguished from so-called functional appliances.

An example of interrupted continuous forces may be illustrated by tying the tooth to a slightly expanded labial arch. This type of force is favorable especially when it can be kept light enough. A hyalinized area may be created on the pressure side in this instance as well, but as soon as it has been eliminated by bone resorption the force will decrease rapidly as the tooth moves. Finally it is retained passively by the arch wire, during which period there will be time for calcification of newly formed preosseous structures laid down on the tension side.

On the pressure side, it is characteristic of an interrupted continuous tooth movement for new bone layers to be formed in the many-celled tissue at the entrance of open marrow spaces, as soon as tooth movement is terminated.

Intermittent forces will create a favorable tissue reaction, especially on the pressure side. The resorption process following the application of intermittent or removable appliances is characterized by the interruption of the active force as the plate is moved out of position. Functional appliances will move more or less in accordance with the movement of the jaws. Thus, in a treatment with intermittent forces the nutritional conditions on the pressure side are favored, to a varying degree, by an increased blood circulation frequently manifested by an augmentation in the number of cells.

Of the functional appliances, it is noted that one of them, the elastic appliance constructed by Bimler,[1] is usually worn during the day as well as during the night. It has been claimed that this longer period of treatment, together with the elastic action of the plate, may influence the tissue reaction

to some extent. In a series of experiments conducted with this appliance, direct resorption was observed on the pressure side of the tooth moved in some cases. In other cases only a slight increase in the cell number was observed. This is a normal reaction, since the appliances were quite passive.

In another series of experiments, gradual increase of the force was exerted by applying a piece of gutta-percha, 0.5 mm. thick, to the surface of the plate contacting the tooth to be moved. The layer of gutta-percha was softened over a flame before insertion of the plate. A new piece of gutta-percha was added to this layer at certain intervals. By measurements, the force exerted on the tooth to be moved was estimated as being around 70 to 100 grams. The control tooth of the opposite side of the jaw was completely relieved from contact with the plate.

Some variation was found in the tissue reaction as well as in the degree of tooth movement. It is likely that these variations, to some extent, were caused by the individual tissue response.[2] Hence, in the present series (Table I) the degree of tooth movement was only minor in the first experiment.

TABLE I. ELASTIC FUNCTIONAL APPLIANCES (FORCE: 70 TO 100 GRAMS)
12-YEAR-OLD PATIENTS
PRESSURE SIDE

EXPERIMENT NO.	TOOTH MOVED	DURATION OF EXPERIMENT (DAYS)	DEGREE OF MOVEMENT (MM.)	INCREASE CELL NUMBER	HYALINIZATION	BONE RESORPTION	APPOSITION OF OSTEOID
1	4+	8	0.3	+	?	+	0
2	4+	15	1.0	+	+	+	+
3	4+	6 14	1.1	+	?	+	+
4	4+	16	1.5	+	+	+	+
5	4+	27	1.8	+	0	++	+

Except in the first experiment, all teeth were considerably displaced in a relatively short time, a result partly ascribed to the fact that the plates were worn during the day as well. Decrease in the cell number in circumscribed areas was observed in the first and third experiments. Formation of osteoid tissue in areas not under direct pressure occurred in four of the experiments. Increase in cellular elements was observed in areas not under pressure.

Decrease in the cell number on the pressure side, but no complete hyalinization, was observed by histologic examination of the first and third experiments.

Hyalinization in circumscribed areas was observed in the second and fourth experiments. The time—tooth movement curve of the second experiment is shown in Fig. 5, *A*. It appears that hyalinization lasted for four days. Fig. 6 represents an area of the pressure side of the tooth moved.

In the third experiment, as indicated in Table I, no gutta-percha layer was added during the first six days (Fig. 5, *B*). As a result, the tooth did not move to any perceptible extent. Tooth movement started as soon as a gutta-percha layer had been fixed to the appliance. This experiment illustrates how tooth movement by functional forces is dependent on a certain degree of contact created between the appliance and the tooth to be moved.

In the fifth experiment a cell-free area may have been created during an earlier period, but this was not observed in the histologic sections. The degree of movement in this last experiment is seen in Fig. 5, *C*. The tooth has been considerably displaced in a fairly short period of time. The cell-free area apparently has persisted for about six days. A section taken from

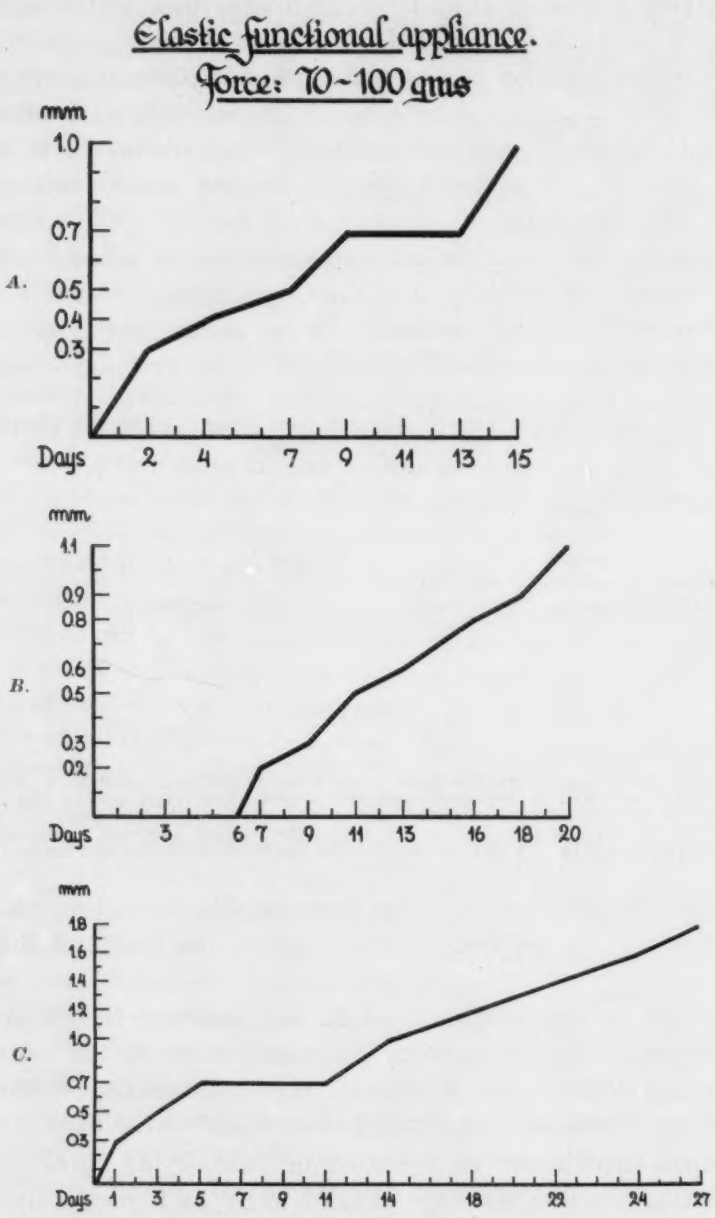

Fig. 5.—A, The second experiment (Table I). The tooth was moved 1 mm. during fifteen days. A cell-free area, interrupting the movement, persisted for about four days.

B, Third experiment. No gutta-percha was fixed to the plate during the first six days. Tooth movement, 1.1 mm. during fourteen days, started after a layer of gutta-percha had been added.

C, Fifth experiment, indicating that a cell-free area, interrupting tooth movement, existed from the fifth to the eleventh day. The tooth was moved 1.8 mm. during twenty-seven days.

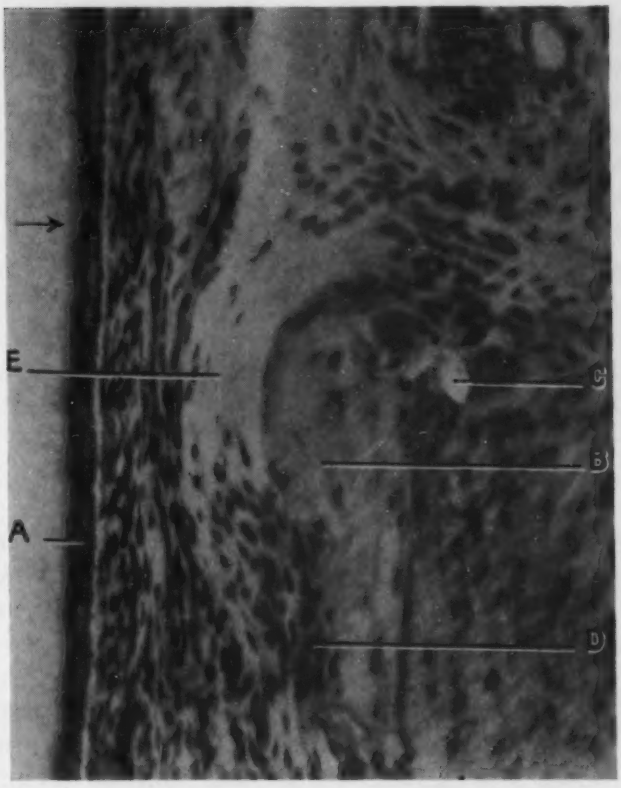

Fig. 6.—Marginal area, pressure side of the tooth moved in the second experiment (Fig. 5). As a result of new gutta-percha added, a semihyalinized area is created. *A*, Root surface; *B*, protruding bone spicule; *C*, indirect bone resorption; *D*, direct bone resorption; *E*, cell-free fiber bundles.

Fig. 7.—Fifth experiment, pressure side, area of the bone crest, tooth movement indicated in Fig. 5. *A*, Root covered by a thin layer of cementum; *B*, outer surface of the alveolar bone crest, actually aplastic; *C*, osteoclast, direct bone resorption along the inner alveolar bone surface. The periodontal membrane, previously partly cell-free, exhibits a moderate number of connective tissue cells.

the pressure side is seen in Fig. 7. Direct bone resorption is observed all along the inner bone surface, surrounded by a moderate number of young connective tissue cells. More apically, formation of new bone layers has taken place, as frequently observed in an experiment performed with intermittent forces.

These experiments tend to prove that functional intermittent forces of around 70 to 100 grams may cause formation of cell-free areas, but these are less extensive and of a shorter duration than in a continuous tooth movement. On the other hand, the degree of tooth movement is considerably increased in accordance with the contact created between the appliance and the tooth surface, as well as in accordance with the time period during which the forces were active. If the plates had been applied without a gutta-percha layer, apparently no hyalinized areas would have been created.

THE MECHANICAL PRINCIPLES

A discussion of forces in orthodontics will also include an evaluation of the mechanical principles involved. As previously mentioned, a tooth with a short root will be tipped considerably and its supporting tissues will react more favorably to an interrupted continuous force or intermittent forces than to continuous forces.

In a comparison of adult teeth with teeth of young persons, it is noted that the adult tooth is tipped less during movement, owing to its strong apical fiber bundles. Consequently, direct resorption may be found in the apical area. Light continuous forces may be applied in such cases.

The importance of the mechanical principles involved is especially apparent when a comparison is made of a tipping movement and a bodily movement. Fig. 8 illustrates the approximate areas under pressure following movement with these two types of forces; in a bodily tooth movement the whole side of the root and in a tipping movement a small circumscribed marginal area are affected. This difference will greatly influence the amount of force exerted. In a tipping movement the tooth will act as a two-armed lever. The active force is always greater than the force applied and is concentrated in a small area near the alveolar crest. In a bodily movement the force applied is not augmented by the mechanics involved and furthermore distributed over the whole side of the root. This can be expressed as follows:

$$\text{Tipping movement} \rightarrow \frac{\text{Force} + \text{Apical reaction}}{\text{Marginal area}} = \text{Force exerted per square millimeter.}$$

$$\text{Bodily movement} \rightarrow \frac{\text{Force}}{\text{Whole side of root}} = \text{Force exerted per square millimeter.}$$

In both cases the final amount will indicate the force exerted per square millimeter. which will be considerably greater in a tipping than in a bodily tooth movement. This explains why hyalinized areas are observed less frequently in a bodily tooth movement than in a tipping movement conducted

with equally strong forces. In a bodily tooth movement it will also be advisable to apply a light force during the initial stage. Later on, the force may be increased considerably in order to overcome the resistance created by stretched fiber bundles.

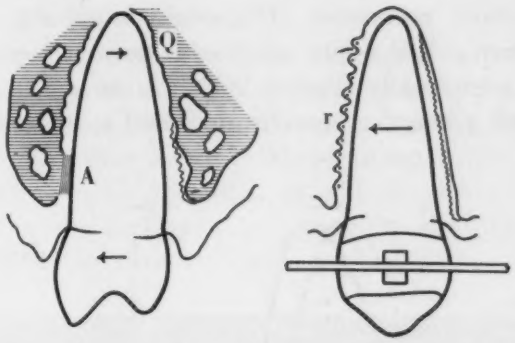

Fig. 8.—In a tipping movement pressure is concentrated in a circumscribed area of the marginal region (*A*). A secondary pressure area is created in the apical region (*Q*). In a bodily movement the force is distributed all along the bone surface (*r*) of the pressure side.

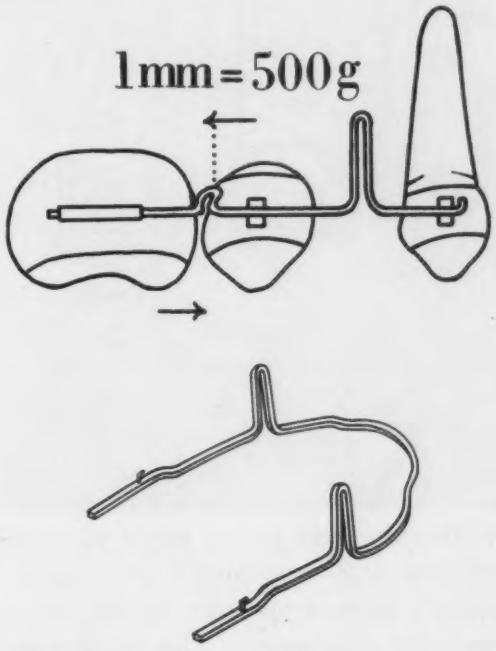

Fig. 9.—By tying the sectional arch back 1 mm., the force exerted on the canine may increase to around 500 grams, a force too strong even in a bodily movement. A more favorable distribution of forces is created when a full arch is applied, because the front teeth are included.

In a bodily movement for closure of spaces after extraction, various types of appliances have been used, some of which are not as appropriate as others, owing to the amount of force exerted.

Fig. 9 illustrates a sectional arch that will exert too much pressure. If the arch is tied back 1 mm., a force of around 500 grams will be exerted. This will cause the anchor teeth to move mesially, while the canine does not move for

a while due to the formation of hyalinized areas. On the other hand, a full arch tied back and applied for final closure of spaces will cause a favorable reaction because so many teeth are attached on both sides of the space.

The appropriate amount of force to be applied in the final stage of a continuous bodily tooth movement of a single tooth may vary according to the length of the root. For upper canines, it may be necessary to apply 150 to 250 grams, and occasionally slightly more during the final stage of closure; between 100 and 200 grams for lower canines and somewhat less for premolars will be required.

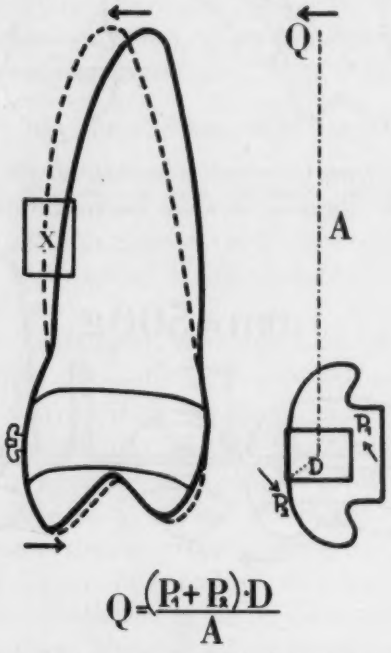

Fig. 10.—The mechanics involved in a movement of torque. The greatest amount of force is exerted at X, where the periodontal membrane is narrowest.

It has been shown by Ketcham[4] and others that excessive resorption of the apical portion of the root may be the result of a bodily tooth movement. It seems more likely that such resorptions are caused by intrinsic factors, or an individual patient's marked tendency to resorption, rather than by the appliances. The possibility also remains that too strong forces were applied.

X-ray pictures of the tooth moved, taken at certain intervals, may enable the operator to avoid such resorptions. Periods of rest or a decrease in the force applied may eliminate the occurrence of apical root resorptions.

The forces exerted in applying an edgewise arch are likewise subjected to certain mechanical laws (Fig. 10). In a movement of torque, the force will be strongest near the marginal region, gradually decreasing toward the apical portion. The force exerted in the apical region (Q) is found by multiplying one-half the length of the diagonal (D) by the force exerted at

the points P_1 and P_2 and dividing by the length of the root (A). The force exerted per square millimeter is again found by dividing the mean force exerted on the distance (A) by the whole side of the root. This amount of force is only a fraction of that exerted in a tipping movement. It is a typical interrupted movement, the force rapidly decreasing as the tooth moves.

In cases of lingual torque, the force exerted at Q can be measured directly. A bracket, soldered at right angles to the end of a short piece of wire, is placed inversely on the torqued portion of the arch wire before the band is cemented. The wire section, extending up to the apical region and forming a sharp angle with the root, should duplicate the root length as determined on the x-ray picture. A measuring instrument is then placed directly on the end of the wire section.

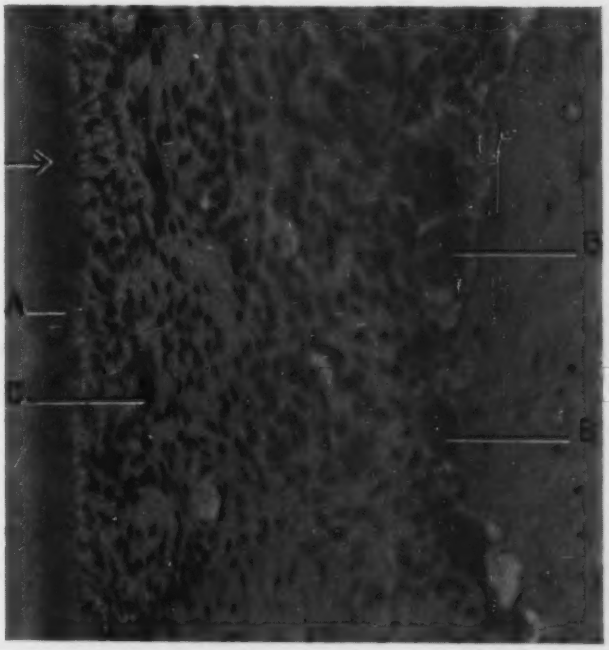

Fig. 11.—The area marked X in Fig. 10, the pressure side, 12-year-old patient, following a movement of torque performed for two weeks with a 0.021 by 0.025 inch edgewise arch. The force exerted at the point Q: approximately 130 grams. Direct resorption takes place all along the inner bone surface. No hyalinized areas were created. The periodontal membrane reveals a normal cell number. *A*, Root surface with a cementum layer bordered by cementoid; *B*, osteoclasts resorbing the inner bone surface; *C*, epithelial rests in the periodontal membrane.

A torquing movement performed with a 0.021 by 0.025 inch edgewise arch, exerting a force at Q of about 130 grams, will produce histologic changes without any hyalinized areas. On the pressure side, following eight days' lingual torque, there was direct bone resorption without any cell-free areas. On the tension side an even layer of new ostoid had been formed. After two weeks' torquing movement, an extensive direct bone resorption was found all along the pressure side of the root. In the marginal area, and still more in the middle area of the root (Fig. 11), as well as toward the apical area, there was formation of a large number of resorbing osteoclasts. On the

tension side, a broad layer of new osteoid was formed. These findings tend to prove that, contrary to what has been assumed, direct bone resorption will take place as a result of a torquing movement exerting a force around 130 grams in the apical region. It also shows that direct bone resorption takes place, provided that the force is light and evenly distributed on the root surface. Further experiments may determine to what extent the force may be augmented without causing hyalinized areas.

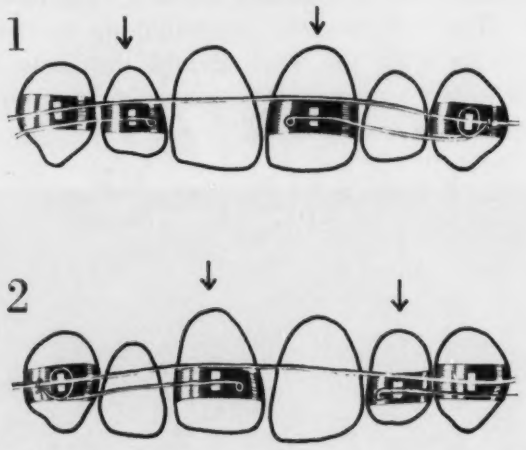

Fig. 12.—An arrangement for extrusion of individual teeth. Because individual fiber bundles will be elongated and because osteoid tissue is formed in the apical region, very little relapse of the released teeth takes place. The appropriate force to be applied on each tooth is approximately 25 grams.

An example of how it is desirable to vary the degree of force is found in the movement of extrusion, which also constitutes a type of bodily tooth movement. In not-so-young patients, as well as in adults, it has been observed that closure of an open-bite may be performed with greater success if the front teeth are extruded individually and not in a mass movement.

This is caused by the fact that periodontal fibrous structures, when displaced by tension all along the alveolar ridge, have a tendency to contract after the forces are relieved, as a result of which relapse of the teeth moved, may take place. Less disturbance of the whole fibrous system is caused by moving teeth individually.

An arrangement for extrusion of individual teeth is shown in Fig. 12. Light springs attached to the labial arch will provide the active force, which should be around 25 grams. After a few weeks, the two teeth moved are released and a similar force is applied to the two proximal teeth. In this way the structures around the two first teeth will have time to regenerate and calcify.

Relapse of the relieved teeth is only slight because individual fiber bundles have been elongated and because newly formed osteoid layers in the apical area will not be resorbed, but will remain there until calcified. It may be necessary to reverse this arrangement again later on until desirable extrusion is obtained.

SUMMARY AND CONCLUSION

During the initial stage of a tipping tooth movement performed with continuous forces, cell-free, compressed areas are frequently created on the pressure side of the root even if the force applied is light. The time required for elimination of the compressed area by indirect bone resorption varies from around two weeks up to three or four weeks, ocassionally longer. The duration of an indirect resorption process is influenced by the length of the root, a short root being likely to entail a longer period of hyalinization. Intermittent forces of around 70 to 100 grams may produce hyalinized areas on the pressure side of the tooth moved, but of a shorter duration than in a continuous tooth movement.

The force exerted in a tipping movement performed with continuous forces will create compressed, cell-free areas in the periodontal membrane more frequently than in a bodily movement, because of the mechanical principles involved. Direct resorption was observed in a torquing movement exerting 130 grams of pressure in the apical region.

The appropriate amount of force to be applied may vary considerably according to the type of movement required; approximately 250 grams during the final stage of a continuous bodily movement of canines, and only 25 grams in a movement of extrusion of individual front teeth should be applied.

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Orthodontic Profiles

ALBIN OPPENHEIM

ALBIN JOSEF OPPENHEIM was born in Brno, Moravia (a province of the former Austria-Hungarian Empire), on Jan. 8, 1875, the second of nine children. He attended high school (gymnasium) in Brno until 1893.

In 1895 he served a half-year as a private in the Austro-Hungarian army, and in 1899 he spent a half-year as a physician in the Military Hospital in Brno, Moravia.

He received his doctor's degree at the Karl Ferdinands University in Prague in May, 1899. He served his internship at the "Wiener Allgemeines Krankenhaus" (General Hospital of Vienna) during five years at the following clinics:

Clinic Professor Dr. Kraft Ebing (psychiatry), July 1 to Oct. 30, 1899.

Clinic Professor Dr. von Schroetter (internal, throat and nose), October, 1900, to April, 1901.

Clinic Professor Dr. Weinlechner (surgery), April, 1901, to May, 1902.

Clinic Professor Dr. Lang (dermatology and syphilis), May, 1902, to May, 1903.

Children's Hospital Professor Dr. Knoepfelmacher (pediatrics), June, 1903, to January, 1904.

Dental School: Berliner zahnaerztliche Poliklinik, 1904.

From 1905 to 1909 he worked as a dentist in Brno. In 1909, at the age of 34, he was called to Vienna by Professor Dr. Weiser to become his assistant in his private practice, where he remained until the outbreak of World War I in 1914. During this time he also carried on classical experiments on tissue changes in monkeys and human beings, which he continued until he was inducted into the army. Immediately upon the start of the First World War in 1914, he joined his regiment and, while he was being transported to the Russian front, a cable from the Archduke Friederich (whose personal dentist he was) summoned him back to Vienna to continue the orthodontic treatment of his grandchildren. This cable saved his life, as during his leave of absence his entire regiment was annihilated in one of the first battles. After being summoned back to Vienna, he was transferred to the Army Hospital No. I, where he was the head of the department for broken and injured jaws and was permitted to work in his private practice, which he established in Vienna in 1914.

In April, 1915, he was appointed *Privatdozent* at the University of Vienna and became head of the Orthodontics Department of the Dental Institute of the University of Vienna. In August, 1927, he was appointed *Ausserordentlicher* Professor (professor extraordinary).

In February, 1911, he and his close friend, Dr. J. Gruenberg of Berlin, were invited as teachers to the world-renowned Angle School of Orthodontia in New London, Connecticut, the first school of orthodontics. Dr. Oppenheim lectured on anatomy, histology, and tissue changes during tooth movement; Dr. Gruenberg lectured on the practical orthodontic case. Here, before the 1911 Angle class, Dr. Oppenheim presented for the first time his classical original research on the subject of tissue changes incident to tooth movement. He presented as evidence the experimental work he had done in Vienna on moving the teeth of monkeys with orthodontic appliances. This work proved to be one of the important milestones in the advance of orthodontics and was convincing evidence that slow, gentle pressure was the thing to be desired in orthodontic technique. As a matter of fact, the basic principles of the original pin tube appliance were based on the evidence revealed in this research.

At about the time that Dr. Oppenheim was doing his research in Vienna, the following articles were published:

Dean, L. W.: The Influence of the Nose on Widening the Palatal Arch, *J. A. M. A.*, p. 941, 1909.

Black, N. W.: The Relation Between Deviation of the Septum and Irregularities of the Teeth and Jaws, *J. A. M. A.*, p. 943, March, 1909.

Pfaff, W.: Stenosis of the Nasal Cavity Caused by Contraction of the Palate and Abnormal Position of the Teeth, *Dental Cosmos*, pp. 570-573, 1905.

Brown, G. V. I.: The Application of Orthodontia Principles to the Prevention of Nasal Diseases, *Dental Cosmos*, pp. 765-775, 1903.

Pullen, Herbert A.: Expansion of the Dental Arch and Opening the Maxillary Suture in Relation to the Development of the Internal and External Face, *Dental Cosmos*, pp. 509-528, discussion pp. 585-592, May, 1912. (Important.)

Ottolengui, R.: Spreading the Maxilla Versus Spreading the Arch, *Dental Items of Interest*, pp. 836-855, 1904.

Haskins, W. H.: The Relief of Nasal Obstruction by Orthodontia, *Laryngoscope* 22: 1237, November, 1912.

Ketcham, A. H.: Treatment of the Orthodontist Supplementing That by the Rhinologist, *Laryngoscope* 22: November, 1912.

These articles reveal that the orthodontic thinking of that period was quite far-fetched as compared with the concepts of today.

Dr. Edward H. Angle entrusted Drs. Oppenheim and Gruenberg with the German translation of his standard work, *Malocclusion of the Teeth.* It was edited and published by H. Meusser of Berlin in 1908 (615 pages). In 1913 the second revised and widely enlarged (778 pages) German edition (also published by H. Meusser of Berlin) appeared. In this second edition two chapters were the original work of Dr. Oppenheim, namely, Chapter VII, "Die

Physiologischen Veraenderungen der Gewebe als Begleiterscheinung der Zahnbewegungen,'' and Chapter XXIII, ''Veraenderungen der Gewebe waehrend der Retention.'' Unfortunately, these two chapters were omitted from the American seventh edition of *Malocclusion of the Teeth.*

In 1926 Drs. Oppenheim and Gruenberg were invited to return to the United States and join the staff of teachers at the Angle School of Orthodontia in Pasadena, California, where they lectured for eight weeks on theoretical and practical orthodontics.

ALBIN JOSEF OPPENHEIM

In 1935 Dr. Oppenheim married the accomplished Emilie Kubrycht in Vienna.

In January, 1936, he was invited by the University of Southern California in Los Angeles, California, to give a series of lectures to the graduate students of orthodontics. He also was invited by the American Association of Orthodontics to present a series of papers at its annual meeting in St. Louis, Missouri. Because of illness, however, he was unable to accept these invitations.

Two years later the political situation in Austria was very critical. Because of Dr. Oppenheim's eminent work and native ability, plus a desire to save him for the good of humanity, Dr. L. E. Ford, dean of the College of Dentistry, University of Southern California, extended to him an invitation to become professor of orthodontic research. At this time the political situation in Austria was deteriorating rapidly and Dr. Oppenheim's life was really in danger. Upon receiving the invitation, Dr. and Mrs. Oppenheim left Vienna for Switzerland as soon as possible. This was none too soon. The day after they left, the Nazi's came to arrest Dr. Oppenheim. In those days, arrest would have meant certain death. Dr. Oppenheim jokingly said that there was at least some satisfaction in hearing that the Nazi's sent a limousine for him. Dr. Oppenheim and his wife arrived in the United States in 1939 and he immediately became active as research professor, a position which he held until his death in November, 1945.

Having left Vienna on a professor's visa, he was permitted to bring his household possessions and his professional equipment, including his library and invaluable histologic slides. In 1944 he and his wife became citizens of the United States of America, and thus realized one of his greatest desires and highest honors.

He was a man dedicated to research in his chosen field, in which he was completely absorbed. He conducted his experiments on monkeys, dogs, and human beings. Practitioners from all over the world demonstrated their appreciation of the work he was doing by constantly supplying him with valuable specimens for use in his investigations. His friendship with Dr. Gruenberg was the source of mutual inspiration, as the two men complemented one another perfectly—Oppenheim the scientist and Gruenberg the practitioner. The ways of working at the University of Southern California were quite different from those in Vienna, and it was difficult for him to adjust himself to the new surroundings. He was a modest man, with a fine sense of humor, and was fond of company, especially with his professional associates.

He took a keen interest in literature, art, and music. He was very fond of his collection of fine paintings and rare prints. As a result of his training in high school, he mastered Latin and Greek perfectly, and found great enjoyment in reading ancient original texts. Although he was not an accomplished musician, he enjoyed playing the piano solely for his own pleasure and relaxation and would often get up between courses at dinner to play a few bars on the piano.

Dr. Oppenheim's desire for his students and others to see things which he saw through the microscope fostered a keen interest in photomicroscopy. Photographing through the microscope became a hobby with him. His success in this field is demonstrated by the beautiful results of his efforts.

It was his wish, and is now the desire of Mrs. Oppenheim and many of his close friends, that his extensive library and the source material of his published works be preserved in an acceptable educational institution.

He is remembered by all who knew him personally as a man of lovable disposition. Devoted to his work, he will forever be remembered by succeeding generations as one of the outstanding scientists who helped place orthodontics on a scientific basis.

Dr. Oppenheim's contribution of "Tissue Changes Incident to Tooth Movement" is, without doubt, one of the all-time important contributions to the specialty of orthodontics; it has received wide acceptance and has been published in part or in toto in many of the leading dental journals of the world.

Spencer R. Atkinson.

Appendix

Honors Conferred on Dr. Oppenheim

Appointed honorary member of the Angle College of Orthodontia, 1912.

Received from the Roumanian Government the high distinction "Mare Ofiter" Steaua Romaniei, civile for scientific merits, 1929.

Appointed honorary member of the Zahnaerztliche Gesellschaft in Wien (Dental Society in Vienna), 1932.

Appointed honorary member of the Swedish Dental Society (Svenska Tandlaekare—Saellskpet), March, 1938.

Appointed honorary member of the Pacific Coast Society of Orthodontists, San Francisco and Los Angeles, 1941.

Appointed honorary member of the Mexican Orthodontic Society, Mexico, D. F., 1942.

Appointed honorary member of the New York Society of Orthodontists, New York, 1945.

Lectures Given by Dr. Oppenheim

1935 and 1936, Prague, Czechoslovakia.

1937, Innsbruck, Austria.

1938, Budapest, Hungary.

1940, San Francisco, California (Angle Society of Orthodontists).

1941, San Francisco, California (Pacific Coast Society of Orthodontists).

1945, Chicago, Illinois (mid-winter meeting of the Chicago Dental Society).

1945, Denver, Colorado (Denver Summer Seminar for the Advanced Study of Orthodontics).

Published Works

Verschiedene Methoden der Herstellung von Goldinlays, Oesterr. ungar. Vierteljschr. Zahnh., January, 1908.

Die Verwendung diatorischer Zaehne zu Kronen und Brueckenarbeiten, Verwertung der Gussmethode, Oesterr. ungar. Vierteljschr. Zahnh., 1908.

Der "Working Retainer" in der Therapie der Kl. II, Oesterr. ungar. Vierteljschr. Zahnh. April, 1911.

Die Veraenderungen der Gewebe insbesondere des Knochens bei der Verschiebung der Zaehne, Oesterr. ungar. Vierteljschr. Zahnh., October, 1911.

Tissue Changes, Particularly of the Bone, Incident to Tooth Movement, American Orthodontist, October, 1911, and January, 1912.

Kritische Bemerkungen zu dem Artikel Hauptmayers "Ueber die anatomischen Veraenderungen des Unterkiefers bei einigen Stellungsanomalien der Zaehne unter Zugrundelegung der roentgenologischen Befunde," Deutsche Monatschr. Zahnh., 1913.

Die Veraenderungen der Gewebe waeherend der Retention, Oesterr. ungar. Vierteljschr. Zahnh., July, 1913.

Extractionsverstuemmelungen im Milch und bleibendem Gebiss, Oesterr. ungar. Vierteljschr. Zahnh., October, 1919.

Extractionsverstuemmelungen im Milch und bleibendem Gebiss, Erwiderung an Dr. Greve, Oesterr. ungar. Vierteljschr. Zahnh., January, 1920.

Histologische Befunde beim Zahnwechsel, Ztschr. Stomatol., October, 1922.

Muskeluebungstherapie "nach Rogers," Ztschr. Stomatol., July, 1925.

Gemeinsam mit J. Gruenberg Referat: "Orthodontische Therapie," Fortschr. d. Zahnh., 1925, 1926, 1928.

Die Prognathie vom anthropologischen und orthodontischen Gesichtspunkt, Ztschr. Stomatol. June, 1927.

Prognathism From the Anthropological and Orthodontic Viewpoints (Translation, Part I), Dental Cosmos, November and December, 1928.

Ueber Wurzelresorption bei orthodontischen Massnahmen, Ztschr. Stomatol., July, 1929.

Die Prognathie vom anthropologischen und orthodontischen Gesichtspunkt. II. Teil Rassenschaedel, Ztschr. Stomatol., April, 1930.

Prognathism From the Anthropological and Orthodontic Viewpoints (Translation, Part II, Negro Skulls), Dental Cosmos, June and July, 1930.

Bone Changes During Tooth Movement, INT. J. ORTHODONTIA, May, 1930.

Verbuergt die Verwendung kontinuierlich wirkender Kraft den optimalsten biologischen und klinischen Erfolg? Ztschr. Stomatol., June, 1933.

Die Krise in der Orthodontie. I and II. Teil, Ztschr. Stomatol. Heft 7, 8, 14, 15, 22, 1933.

Raddrizzamento dei denti del gindizzio inclusi disposli oliquamente, Prat. ortoguatodontica, 1933.

A Practical Suggestion, INT. J. ORTHODONTIA, September, 1934.

The Crisis in Orthodontia (Translation), INT. J. ORTHODONTIA, December, 1933, January, August, October, and December, 1934; January and August, 1935.

Biologic Orthodontic Therapy and Reality (Translation) Angle Orthodontist, July and October, 1935; January, April, and July, 1936.

Einzelne bei jeder orthodontischen Behandlung zu beruecksichtigende Detailfragen und Momente, Prakt. Zahn. Jahrg. V, Heft 1, 1937.

Der Lückenschluss, Ztschr. Stomatol., Heft 11, 1937.

Artificial Elongation of Teeth, AM. J. ORTHODONTICS, October, 1940.

Human Tissue Response to Orthodontic Intervention of Short and Long Duration, AM. J. ORTHODONTICS, May, 1942.

A Possibility for Physiologic Orthodontic Movement, AM. J. ORTHODONTICS, June, 1944.

Books:

Die Orthodontie und ihre Beziehungen zur konservierenden Zahnheilkunde, Berlin, 1912, Hermann Meusser.

Die Rise in der Orthodontie, Wien, 1933, Urban & Schwarzenberg.

Biologisch orthodontische Therapie und Wirklichkeit, Wien, 1936, Urban & Schwarzenberg.

Erratum

In the article by Harold D. Kesling entitled "The Diagnostic Setup With Consideration of the Third Dimension" which appeared in the October, 1956, issue of the JOURNAL, the fourth sentence of the last paragraph on page 740 should read: "The mandibular anterior teeth were placed on the cast within the range of + to –5 as indicated by the profile of the patient."

Editorial

WHY ORTHODONTIC PROFILES?

IF YOU have been reading the published orthodontic text during the past decade, you have no doubt been impressed by the number of authors who make the point that orthodontics is going through some kind of a transition from an art to a science or an applied science.

Plainly, the specialty is growing rapidly, evolving from an aggregation of secular ideas and crafts, but it has hardly started as yet to organize itself into the whole comprehensive body of knowledge that constitutes a true science.

This so-called "changing-times" theme, however, is not new. As a matter of fact, one author or another has been writing about the transition of orthodontics since about the beginning of the century. Much of the writing has taken for a theme the tie-in with the science of anthropology.

The American Association of Orthodontics has appointed a committee consisting of J. A. Salzmann (Chairman), Allan Brodie, Bodine Higley, and Wilton M. Krogman (consultant) to study the feasibility of holding a workshop on roentgenographic cephalometrics. That is both interesting and significant, as it reflects more interest in the anthropologic tie-in between orthodontics and the science of anthropology. It also reveals another of the transition trends to which authors currently refer.

Notwithstanding the changing times reflected in the anthropologic influence, it surprises many to learn that there was enough interest in this subject before World War I to inspire Sinclair Tousey, M.D., to write a paper on the subject of "X-ray Measurement of the Permanent Teeth Before Eruption to Provide for Early Regulation of the Dental Arch." This paper was published in the November, 1912, issue of a scientific journal (*The Laryngoscope*) devoted to ear, nose, and throat problems.

The following quotation from the paper read before the meeting of the Section on Laryngology and Rhinology of the New York Academy of Medicine on May 22, 1912, reveals that Tousey, a doctor of medicine, was going all out to reconcile the erupting teeth with the size of the alveolar bone:

> Double the greatest width of one permanent upper central: add .24 inch to it. The sum is the radius of the circle formed by the occlusal edges of the centrals and laterals and the cusps of the canines. Draw a small circle with this radius and with its center at B. Use the radius to measure the distance in a straight line from A, the space between the centrals, to J and H, the distal points of the canines. Draw lines from C (diametrically opposite to A) through J and H, respectively, intersecting a line tangent to A at E and D. Use the line E D as the radius of a large circle with its center at I. Mark off this radius

six times upon the circumference to determine the inscribed isoceles triangle A F G. The buccal cusps of the bicuspids and molars lie along the lines J to H and H to G. Add 50 percent to the radius of the small circle to get the distance from the anterior surface of the first upper permanent molar to the space between the upper centrals.

Then a clinic was cosponsored by the Eastern Association of Graduates of the Angle School of Orthodontia in conjunction with the American Laryngological, Rhinological, and Otological Society. It brought out some amazing documented evidence that tended to indicate that orthodontics had only scratched the surface on its march to its destiny and that it would ultimately include a much broader and more comprehensive field than the so-presumed (at that time) limited area of the correction of malocclusion of the teeth. The word quickly spread that here was an unexplored new field that was infinitely more important than that then measured by the relation of the jaws and teeth as indicated by the traditional relationship between the mesiobuccal cusp of the upper first molar and the buccal groove of the lower first molar. Optimistic and responsible writers were writing and talking about the new orthodontic treatment being an important supplement to the rhinologist in the relief of common nasal obstruction and the correction of narrow bony auxiliary development. No less an orthodontist than the meticulous, masterly, and dedicated Ketcham of Denver, after doing a great deal of personal research work, read several papers on the subject of "The Treatment of the Orthodontist Supplementing That of the Rhinologist." It was in one of these papers that Ketcham reported the well-known Kilpatrick case which was treated orthodontically by Ketcham and periodically checked by Carmody, M.D., of Denver, throughout the treatment. The record, as published in *Laryngoscope*, speaks for itself. Ketcham wrote, as a case report:

Enlarged tonsils removed at six years of age; adenoids one year later; but the operations were too late to materially help the nasal space or the dental arches, for growth had been so much arrested that while removal of tonsils and adenoids prevented the case from becoming even worse, yet you see what a badly-constricted arch and what mal-occluded teeth the patient had at fourteen years of age when he presented for orthodontic treatment. The boy's rhinologist, Dr. T. E. Carmody, of Denver, reported that on examination he found the nasal space to be about one-half normal not only on account of narrowing, but on account of an intumescent condition of the tissues; septum deflected to the right. It was examined at intervals of several weeks and after packing with adrenalin, the intumescence would disappear and show a narrow nasal space, which became greater as treatment progressed.

The condition on the oral side of the palatine portion of the maxillary bones was fully as bad. The distance across the roof of the mouth between the upper second premolars at the gumline was but eighteen millimeters.

Extraction of two or more pre-molars and the drawing back and down of the upper canines would have been our only recourse a few years previous to the time this case was treated. Unfortunately, such procedure is sometimes followed today, but it leaves the maxillary arch just as narrow as before treatment, and thus can have no beneficial effect upon the nasal cavity. It leaves the teeth still in mal-occlusion with no improvement in function. The patient is left with an undeveloped nasal cavity, deformed oral cavity, with little chance of reaching normal physical development. Fortunately, Dr. Edward H. Angle proved that in these cases, by retaining the full complement of teeth and placing them in their normal positions, development of the alveolar process over the roots of the teeth would take place and there would be a building-in of bone. This was proved in a number of instances by carefully made models.

Since this development of the alveolar process takes place, it is logical to assume there must be a similar development of the maxillary bones, and consequent increase in size of the nasal cavity. This has been verified in many cases by rhinologists' examination before and after the orthodontist's treatment.

To illustrate further that orthodontics does repeat itself, Professor Korkhaus of Bonn, Germany, lecturing before the Central Section of the A.A.O. in Chicago in October, 1956, said:

The orthodontic expansion of the dental arches and of the palate is, in addition, an extremely valuable method for the removal of mouth breathing, which is linked to a large number of compression anomalies. The ear-nose-and-throat specialist often enough refers his patients, suffering from mouth breathing, for orthodontic treatment, when he has realized that the malocclusion present and, above all, the narrowness of the jaw are the chief causes for the impeded nasal respiration and that his own treatment is no longer sufficient to prevent the recurring diseases of the respiratory tract.

Still another instance of transition of history repeating itself over the years, is reflected in the following quotation from Angle:*

The nuts were tightened every third day, moving the teeth out as far as desired, in about three weeks. While this was being done the lower jaw was being acted upon, the first bicuspids having been extracted, the lower incisors and cuspids were moved backward, until the cuspids occupied the space from which the bicuspids had been removed, as shown in Fig. 51.

In treating some of these cases it may be found of advantage to continue pressure upon the maxilla by attaching the elastics from the headgear to hooks soldered to a swedged metallic cap, fitting accurately to the chin, as recommended by Dr. Allen. The object being, by continued pressure, to bend the jaw at the angles, but only in very young patients do we believe this even possible.

At any rate, the documented record of orthodontic history makes it plain that, basically, the record came from a kind of trial-and-error craft proposition, and that the slide rule aspect has been only a part of the over-all thinking.

The documented record is growing more and more interesting, with current trends coming into view. There was, for instance, Simon's contribution, "The Law of the Canine." Stanton contributed a kind of engineering slide rule concept to ascertain an expectancy of occlusal relations in advance of treatment. Hellman's work consisted largely of studies of the human face by methods employed largely in the science of anthropology.

Angle, probably the greatest teacher of all, promulgated as a hypothesis the constancy of the permanent molar and made it something of a cornerstone of anatomy, from which to start in making a diagnosis. Tweed, one of Angle's students, came along much later and claimed that some of the Angle concepts, particularly his views on the extraction of teeth in treatment, were fictional. The Tweed concepts have assembled a large following and the extraction ideas have again proved the contention that history repeats itself in orthodontics as well as in other fields.

The above summary of "changing times" reveals some of the interesting reasons why the AMERICAN JOURNAL OF ORTHODONTICS has decided to publish the profiles of some of orthodontics' pathfinders and their work.

*Angle, E. H.: The Angle System of the Regulation and Retention of the Teeth, ed. 3, Philadelphia, 1892, Wilmington Dental Mfg. Co.

Another inspiration comes from the *Journal of Pediatrics,* which from time to time publishes what it calls "profiles of pediatricians who contributed much to the creation and progress of pediatrics as a specialty." Each profile consists of a brief digest of the man's life and an outline of what he created and accomplished for his profession, presently or during his lifetime. Most of the men (in the case of the pediatricians) are no longer living; however, some of the profiles are of living persons who are still working. In this way, then, every few months there is created another link in the chain of recording the history of the pioneers. This department of the *Journal of Pediatrics* is one of the most popular departments, from the standpoint of reader interest, ever published.

It was thought that profiles might be a very satisfactory feature to publish for the readers of the AMERICAN JOURNAL OF ORTHODONTICS, and the plan has the full cooperation of the Editorial Board. The profiles will be written by authors who are familiar with the life story of the persons whose work is to be recorded. If the author was not acquainted personally, it can be assumed that he has read and digested the written record carefully and painstakingly. It is to be hoped that the readers of the AMERICAN JOURNAL OF ORTHODONTICS will enjoy reading the profiles of those who helped create the specialty of orthodontics.

H. C. P.

Word has just been received of the death of Dr. Oscar Jacobson of New York, president of the Northeastern Society of Orthodontists.

Reports

FOREWORD

Things happen with the passing of time. Habits, customs, and trends make rapid changes in practically everything that has to do with human affairs. In the years between World War I and the present, transportation, for example, underwent spectacular changes. About the time that the AMERICAN JOURNAL OF ORTHODONTICS was founded in 1915, it took several days by rail to cross the American continent. Now, in the Jet Age, the same thing may be accomplished in just a few hours.

During that period of about forty-one years, the custom of presenting manuscripts before various orthodontic societies also has gone through some rather spectacular changes.

In 1915, when the JOURNAL was founded, essayists exercised the customary routine of preparing formal manuscripts for presentation before the societies and at the same time they reconciled illustrations with the formal paper for the purpose of publication subsequent to the formal reading. The idea in mind, of course, was that the paper should be formally recorded for all time and that publication was an official and important part of the transactions of the organization.

Times have changed. Now, by contrast, many important and interesting papers are prepared for presentation before societies and are reconciled with the exhibit of profuse Kodachrome slides to enhance interest. Also, many important parts of these papers are not written in advance; they are delivered more or less off the cuff.

The above circumstances all add up to the practical proposition that, in order to be published and recorded for posterity, papers must go through a kind of "re-write" process subsequent to presentation and must be reconciled with only a few illustrations in order to be suitable for publication.

The practical everyday result of these changes and circumstances brings about a situation in which many of the very fine presentations before various societies are not recorded by publication.

Sensing the seriousness of the problem, Dr. Joseph D. Eby of New York, for many years a member of the Publications Board of the AMERICAN JOURNAL OF ORTHODONTICS and editor for the Northwestern Society, made a report before the Northeastern Society's recent 1956 meeting that is well worth reading. In the report, Dr. Eby makes certain observations and suggestions with the thought in mind that habits and customs may possibly be revised so that many more important papers may be recorded. Every member of the American Association of Orthodontists who is interested in the publication and recording of orthodontic manuscripts should read Dr. Eby's report.

In the past, orthodontics has published the most profuse scientific record of any single department of dentistry. It is to be hoped that this record may be continued in the future, even if papers are *digested* or *abstracted* from the original text. This latter plan would record at least the theme of the paper for all time.

Dr. Eby's report follows.

—*The Editor.*

REPORT OF THE SECTIONAL EDITOR, NORTHEASTERN SOCIETY OF ORTHODONTISTS

American Journal of Orthodontics

THE AMERICAN JOURNAL OF ORTHODONTICS, now in its forty-second annual volume and current 502nd continuous monthly issue, is comparatively in as fine a condition as it has ever been within its history.

That the JOURNAL, in maintaining its high level of production, is obviously controlled by the limits of sources from which suitable manuscripts, and above all actually publishable material, can be obtained there is no doubt. These official sources are the American Association of Orthodontics, the eight sectional societies, and the American Board of Orthodontics. These may be augmented by publishable material from foreign and other outside procurable sources, but not many. Any and all of these supply lines are entirely subject to the authorities of the editor-in-chief and his staff of sectional editors.

There are established regulations of editorial policies which pertain to progress, quality, reader interest, and the guidance or control of acceptable material values in terms of progress timing. From the manual point of control, there are regulations which place certain limits on manuscripts, number of illustrations, quality, reader interest, and careful appraisal in avoiding repetition and in the selection of material which in variety and sequence from month to month will continue to enhance the JOURNAL which, within its enviable history, has become the shrine of modern progress in principally American orthodontic literature.

Your sectional editor maintains a constant contact with Editor-in-Chief Pollock, averaging an exchange of several letters a week. These frequent contacts involve a constant study of trends, alert observations, discussion of new ideas and plans, and alterations of policies which effect the ever-changing scenes locally or generally in the movements of orthodontic progress in numerous directions.

In order to properly administer the relations between the JOURNAL and the Northeastern Society of Orthodontists, particularly as they pertain to the concentrated area of Greater New York, the efficient services of Dr. Salzmann, in his capacity of editor of "Abstracts and Reviews," in matters of opinion or where definite decisions have to be made are frequently sought.

In the performance of the duties of the Assistant Editor in the preparation of reports of our meetings to be published in the JOURNAL, and in the very serious matter of collecting the manuscripts from essayists, the services of Brainerd Swain are indispensable.

Dr. Pollock submitted a comprehensive annual written report as editor-in-chief of the JOURNAL at the directors' meeting of the American Association of Orthodontists in Boston last April. In that report he dwelt principally on the expense of and the regulations which pertain to the high cost of the increasing number of illustrations, which eventually have to be cut down or paid for by the essayist. He mentioned the fact that the authors whose names incite the greatest reader interest are those who have made formal presentations before the A. A. O. or the Sectional Societies. He also stressed the point that

manuscripts must be carefully prepared for publication and not sent to the editor in an unfinished condition.

On page 59 of the January, 1956, issue of the JOURNAL appears a very explicit article entitled "Suggestions to Authors of Articles to Be Submitted to the AMERICAN JOURNAL OF ORTHODONTICS." There was wide distribution of reprints of these directions, supposedly to officers of sectional societies and particularly to chairmen of program committees and secretaries. For a long time there has been a dearth of articles from the Northeastern Society of Orthodontists because presentations have been mostly made extemporaneously or from notes, with profuse Kodachrome slides; these are tedious to edit and convert. The principal question I wish here to bring up for discussion at this directors' meeting is the arrangement for the availability of papers read before the Northeastern Society of Orthodontists suitably prepared for publication.

A count of the programs of our last four meetings in 1955 and 1956 reveals an average of about eight papers for each of the two-day meetings, a total of sixteen papers. For the twelve issues of the JOURNAL in 1955, a total of fifty-two papers were published, including ten from the Northeastern Society. For the first ten issues, through October of this year, there have appeared forty-two papers in the JOURNAL, of which only one paper came from the Northeastern Society of Orthodontists. This made a total of one-half the papers over two years.

Whatever a discussion may bring out, I would like to recommend strongly that the chairman of our Program Committee should be definitely instructed in some plan to request essayists to prepare shortened *digests* of their papers suitable for publication with limited illustrations, and after that to present their papers ad lib from notes, if they prefer, and with all of the illustrations they please. This seems to be a part of the solution to the problem in this present-day trend toward the projection of numerous colored slides, an aversion to the efforts necessary for writing papers, and the acceleration of greater liberties in their representation. It is my intention and hope that this report will evoke some constructive discussion and effective solution of this problem.

In the proper spirit of mutual cooperation on behalf of the Editorial Staff of the JOURNAL and the Executive branches of all official society organs, it is expected that this will be universally put into effect.

These shortened *digests* designed to highlight modern trend papers, with suitable black and white "key" illustrations, should be readily forthcoming and excite both value and reader interest.

A concerted and determined action on the part of the Chairmen of the Program Committees of the American Association of Orthodontists and the eight all-important Sectional Societies will elevate greatly the quality and value of the JOURNAL and maintain it on the level of its highest-class proficiency and production as the "shrine" of orthodontic literature.

JOSEPH D. EBY, Sectional Editor,
Northeastern Society of Orthodontists.

October, 1956.

In Memoriam

CARL SHIVELEY LEWIS
1905-1956

CARL SHIVELEY LEWIS, of Mount Lebanon, Pennsylvania, died of a cerebral hemorrhage on Sept. 29, 1956.

Dr. Lewis was born in Edgewood, Pennsylvania, in 1905. He attended schools in Edgewood and was graduated from the University of Pittsburgh Dental School in 1936. During the first nine years of his professional life he was associated with Drs. D. Willard, Wilson R. Flint, and Edwin G. Flint in the practice of orthodontics in Pittsburgh, Pennsylvania. Since 1945 he had conducted a private practice in Mount Lebanon, Pennsylvania. His kind and sympathetic nature endeared him to the hearts of his many patients.

Dr. Lewis was active in civic and professional societies. He was a past elder of the Mount Lebanon Presbyterian Church. He was a member of the following organizations: John A. Brashear Lodge, F. and A.M.; South Hills Kiwanis Club; Odontological Society of Western Pennsylvania; Pennsylvania State Dental Society; American Dental Association; Great Lakes Society of Orthodontists; and Delta Sigma Delta fraternity. He was also an institutional representative of the Boy Scouts.

Surviving are his widow, Pauline Gray Lewis; his father, Lincoln G. Lewis; a brother, L. Earl Lewis; and three sisters, Mrs. George Johnson, Mrs. William M. Ewing, and Mrs. Wilson R. Flint.

Department of Orthodontic Abstracts and Reviews

Edited by
DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Observation and Treatment of Cases of Developing Progenia From Deciduous Dentition to Adult Age: By Birger Kjellgren (Stockholm). The 1955 Transactions of the European Orthodontic Society.

There are many false Class III cases (actually Class I cases) in which the lower jaw is forced to occlude in a forward displaced position by an incisor cross-bite caused primarily by the somewhat contracted or underdeveloped anterior part of the maxilla. These false Class III cases, in which an incisal edge-to-edge bite is easily produced by the patient, are usually easy to treat by forward expansion of the upper arch. The prognosis is good, provided that a normal deep incisor overbite can be created.

There are also many cases, which can be treated reasonably well by orthodontic means, in which a moderately oversized mandibular dental arch is combined with some contraction in the maxillary arch; orthodontic treatment is also effective in such Class III cases as show a slight crowding in the mandibular arch and a more severe contraction of the anterior maxillary arch. The treatment usually requires the extraction of mandibular premolars and a lingual inclination of the mandibular incisors to meet the forward expanded upper arch; some mesioclusal relationship of the molars persists. A distal displacement of the mandible to a normal relationship with the maxillary arch is seldom possible by orthodontic methods. It sometimes occurs that, in spite of orthodontic treatment, the lower jaw eventually becomes increasingly protruded and a real prognathism develops, which can be effectively treated by surgical means only.

There are also cases of genuine prognathism where the maxilla is of normal size and the mandible is more or less protruded or oversized. These cases can show a rather progressive development of increasing mandibular protrusion and at the end of the growing period (at about 20 years of age) show very severe malrelation of the jaws. The only rational treatment for these jaw deformities is surgical. The operation should not be done before jaw development is completed. The third molars should be fully erupted or else extracted.

Kjellgren prefers buccal appliances attached to all the teeth in each jaw; this method gives good control in placing the teeth and the jaws in the desired and prepared new occlusal position.

Casts are made before the operation and are prepared by necessary grindings to fit in good functional occlusion and to create a preferably deep incisal overbite when put in the new desired position immediately after the operative cutting of the rami. The natural teeth are ground, according to the prepared casts, before the operation.

The upper condylar fragment is always tipped forward and upward by the muscle traction, but this does not cause poor healing, according to experience. Pseudarthroses are very seldom seen. The posterior border of the ramus will show a smooth S-shaped form after some years. Paresthesia of the mentalis nerve is a complication that appears frequently and persists for some months; in some cases a partial paresthesia remains for some years. Opening movements soon return to normal, while the lateral and protrusive excursions are slightly decreased in most cases. It is often difficult to diagnose accurately the future pathologic development of a Class III case in deciduous or mixed dentitions.

In cases of genuine prognathism, early treatment during the deciduous dentition is advisable if a normal overbite can be created. In young patients showing a moderate inverted overbite but no overjet, a grinding off of the molar cusps and the incisal part of the crowns of the deciduous anterior teeth might give an improved intermaxillary relationship and possibly a chin strap will have some retruding effect on the mandible. If a relapse should occur at the time of the eruption of the permanent incisors, new treatment might be attempted to obtain normal incisor overbite. Should relapse again take place, the prognosis for further orthodontic treatment is bad. The result of prolonged orthodontic endeavor would be simply a fatigued young patient. In this case, it is better to wait for the possible progressive prognathic development to age 18 to 20 years and at that time to perform the surgery. Even in extreme cases, the results obtained from the cases studied in Sweden following this plan of treatment are satisfactory.

(*Note:* Personal experience in treating developing true Class III malocclusion in young patients shows a tendency of the middle third of the face to continue to develop anteriorly, while the forward growth of the mandible is inhibited by using a chin cap as described by Oppenheim. The use of a mandibular plate with an inclined plane to fit under the anterior part of the palate, while the incisors are kept out of Class III relation, is also beneficial.—J. A. S.)

News and Notes

Scientific Program and Other Related Activities for the Meeting of the American Association of Orthodontists, May 12-16, 1957, Roosevelt Hotel, New Orleans, La.

The sustaining strength of a professional society such as the American Association of Orthodontists lies in the sense of objective realism to be found in the scientific program. The good name of a society is determined by its essays, clinics, conferences, and discussions, and these, to a considerable degree, by the quality and standards of the participants. These facts influence substantially the potential and ultimate progress of the Association and the specialty toward improved methods of diagnosis and treatment.

For 1957 the scientific sessions of the first day (May 13) are devoted to etiology and are arranged to provide a natural sequence or "flow." Each speaker will discuss a specific phase of causation from the negative as well as from the positive aspects. We believe that this provides a coordination of effort and instruction not possible when unrelated papers are read.

The second day (May 14, morning session) likewise has a natural "flow" devoted to treatment. Each speaker has been asked to discuss principles of treatment measures as related to age groups. There will be table and projection clinics, a round-table luncheon discussion, and reports of research.

An innovation this year will be "conference rooms" on case analysis and treatment planning. This can be very useful to our members, and they are urged to take advantage of it. Members of the Association are invited to prepare a problem case, one which prior to treatment or during treatment has given trouble, for submission to the staff of a conference room for diagnosis, analysis, and advice. Cases should be supported by written history and available diagnostic records. Further information may be obtained from Dr. H. K. Terry, 2742 Biscayne Blvd., Miami, Florida.

A thesis written by a successful candidate to the American Board of Orthodontics (1956) will be read.

There will be an exhibit of case reports by diplomates of the American Board of Orthodontics.

Two panels will complete the scientific program, one relating to personality and psychological problems and the other to the many details of practice management.

The American Board of Orthodontics will present the Ketcham Award.

The detailed schedule follows:

Sunday, May 12

2:00 to 5:00 P.M. Registration (everyone who can possibly do so is urged to register at this time).

Monday, May 13

8:00 A.M. Registration—your officers strongly recommend that you do not wait until the last minute to register—the desk will be open for registration Sunday, May 12.

9:00 to 9:30 A.M. Invocation. Rev. John F. Keller, S.J., Chaplain, Dental School, Loyola University, New Orleans, Louisiana.

Address of Welcome. Hon. deLesseps Morrison, Mayor of New Orleans, Louisiana.

Response. Franklin A. Squires, White Plains, New York, president-elect of the American Association of Orthodontists.

9:30 to 10:00 A.M. President's Address. A. C. Broussard, New Orleans, Louisiana.

10:00 A.M. SCIENTIFIC PROGRAM.

Presiding: George M. Anderson, Baltimore, Maryland, program chairman.

The sessions of the first day are devoted to etiology and are arranged to provide a natural sequence or "flow." Each speaker will discuss a specific phase of causation, from the negative as well as from the positive aspects. In this way, we believe, there is a coordination of effort and instruction not possible when unrelated papers are read. Therefore, we have a basic subject heading or title for the papers for this day, two in the morning and two in the afternoon.

Basic Subject: "Malocclusion Is a Resultant of—"

10:00 A.M. Genetics. Harold J. Noyes, Portland, Oregon.

11:00 A.M. Bone Inequities. Harry Sicher, Chicago, Illinois.

12:30 P.M. Golden Anniversary Luncheon. William B. Stevenson, Sr., Amarillo, Texas, Vice-President, American Association of Orthodontists, presiding.

2:30 P.M. Scientific Program (Cont'd).

Presiding: Frank Bowyer, Knoxville, Tennessee, president, Southern Society of Orthodontists.

2:30 P.M. Intrinsic or Local Factors. Thomas D. Speidel, Minneapolis, Minnesota.

3:30 P.M. Extrinsic or General Factors. T. M. Graber, Chicago, Illinois.

Tuesday, May 14

9:00 A.M. Scientific Program (Cont'd).

Presiding: Tom M. Williams, Dallas, Texas, president, Southwestern Society of Orthodontists.

This morning also is planned to have a natural sequence which is devoted to treatment. Each speaker will discuss a specific age group under a basic subject heading or title of "Aims and Methodology of Corrective Measures According to Age Groups." Webster defines *methodology* as a "branch of logic dealing with principles of procedure whether of theoretic or practical science."

9:00 A.M. The Deciduous Dentition. Edward A. Cheney, Lansing, Michigan.

9:45 A.M. The Mixed Dentition. Faustin N. Weber, Memphis, Tennessee.

10:30 A.M. The Permanent Dentition. Malcolm R. Chipman, Spokane, Washington.

11:30 A.M. Presentation of the Albert H. Ketcham Memorial Award of the American Board of Orthodontics by Ernest L. Johnson, San Francisco, California, president, American Board of Orthodontics. Acceptance by Oren A. Oliver, Nashville, Tennessee.

12:30 P.M. Past-Presidents' Luncheon.

1:30 P.M. Research Program conducted by the Research Committee, Presiding: Alton W. Moore, Chairman, Seattle, Wash.
The Prize-Winning Essay.
Essayists receiving honorable mention.
Research reports, in person and by title.

4:00 P.M. Business Session of the American Association of Orthodontists.

Wednesday, May 15

9:00 to 11:30 A.M. Table and Projection Clinics.
In charge: William S. Brandhorst, St. Louis, Missouri, Program Committee member.

12:00 M. to 2:30 P.M. Round-Table Discussion Luncheon.
In charge: Arnold Stoller, Seattle, Washington, Program Committee member.

2:45 to 4:45 P.M. Conference Rooms. "Case Analysis and Treatment Planning."
In charge: H. K. Terry, Miami, Florida, Program Committee member.
These rooms are an innovation. Their purpose is to provide an opportunity for practitioners with problem cases to have them analyzed and discussed by "diagnosticians and assistants" with the hope that the problem may be relieved or lessened.

Members of the Association are invited to prepare a problem case for submission to one of the conference rooms and they are requested to contact Dr. Terry for advice as to further procedure. Cases should have a written history supported by available diagnostic records.

We believe this to be an outstanding opportunity to receive help with your orthodontic problems. Take advantage of it.

Each conference room will have a "diagnostician" who will have an "assistant." They are:

Diagnostician	*Assisting*
1. Philip Adams	William H. Oliver
2. Spencer Atkinson	Ted Gettinger
3. J. Lyndon Carman	Hubert J. Bell, Jr.
4. Edward Cheney	Harlow Shehan
5. Malcolm R. Chipman	Alton W. Moore
6. G. Vernon Fisk	Ross O. Fisk
7. T. M. Graber	Glenn Jackson
8. Andrew Jackson	John Jackson
9. Herbert I. Margolis	Eugene Nelson
10. Oren Oliver	Boyd Tarpley
11. Paul Reid	J. Henry O'Hern, Jr.
12. J. A. Salzmann	Meyer Eggnatz
13. Robert Strang	Will Thompson
14. Raymond Webster	Donald Osborn
15. Albert Westfall	Marcus Murphy

Thursday, May 16

9:00 A.M. Scientific Program (Cont'd).
Presiding: W. Paul Hoffman, Washington, D. C., Program Committee member.
"Some Illusory Phenomena of Importance in Orthodontics." (An original thesis presented to the American Board of Orthodontics toward certification.) Donald MacEwan, Seattle, Washington.

9:45 A.M. Panel.*
Subject: Parent and Patient Personality and Psychological Problems.
Moderator: William S. Smith, San Francisco, California.
Panelists: M. Duke Edwards, Montgomery, Alabama.
T. M. Graber, Chicago, Illinois.
Kyrle W. Preis, Baltimore, Maryland.
Phillip W. Starr, Omaha, Nebraska, will open the discussion with a brief generalized statement.

11:00 A.M. Panel.*
Subject: Office Procedures, Business Management, Office Location, Associations, and Partnerships.
Moderator: Brooks Bell, Dallas, Texas.
Panelists: Stephen C. Hopkins, Sr., Washington, D. C.
V. Everett Hunt, Eureka, California.
Cecil Muller, Omaha, Nebraska.
Alexander Sved, New York City.

12:30 P.M. Business Session of the American Association of Orthodontists.
Adjournment.

American Association of Orthodontists Conference Rooms

Conference rooms for case analysis and treatment planning will form a part of the 1957 New Orleans program. They will be scheduled for Wednesday afternoon, May 15.

Each member of the Association is invited to bring a problem case with history, photographs, casts, radiographs, cephalographs, or other data the member considers necessary. This he will turn over to an "assistant" to the "diagnostician," who will present the material for discussion for the benefit of the orthodontists in attendance. Questions and answers should help clarify the problems.

While this is an innovation, the Program Committee believes that these conference rooms offer a real opportunity for cooperation and participation by members who have had difficult problems and have needed qualified help in solving them.

This is your invitation to participate, but you must advise the Program Committee (Dr. H. K. Terry, 2742 Biscayne Blvd., Miami, Florida) at least by April 12, 1957, that you wish a case analysis, so that proper scheduling of the conference rooms may be made.

American Association of Orthodontists Program Committee

The Program Committee for the New Orleans meeting feels that some of the gap can be bridged between training with empirical diagnosis and experience with intangible factor diagnosis. It may be accomplished by getting the experienced diagnostician to relay his thinking as he diagnoses, analyses, evaluates, and plans treatment for a specific case.

When the diagnostician presents a case that he has already gone over and even treated successfully, these thought ramifications are not likely to come out in the presentation of that (his own) case.

We feel, therefore, that if a member brings a case with a history, photographs, casts, radiographs, etc., as he would routinely have in his office (or as he woudd prepare it for the American Board) and this case is presented to the diagnostician by an "assistant" or "supervisor," the thinking of the diagnostician would be of value to all those present. The case should be a problem case, not yet treated or in the process of being treated. The

*You are invited to mail to the moderators prior to the meeting any questions in which you may have a special interest.

member gives the case material to the assistant who presents it to the diagnostician and those present. The assistant and the diagnostician discuss points that bring out the thinking process that goes into the analysis and treatment planning.

The only problem is that the patient himself should be present, but all of us understand this and must properly weigh it in the balance with any diagnosis given.

Those wishing to present a case to a diagnostician must let the Committee know at least one month prior to the meeting. The actual material need not be sent; just a letter requesting the review of your case by one of the diagnosticians will suffice.

Rules Covering Visitors to the 1957 Meeting of the American Association of Orthodontists, May 13 Through May 16, Roosevelt Hotel, New Orleans, La.

To insure full participation of all members, it is necessary to limit attendance to fully privileged members of the American Association of Orthodontists and the following:

A. *No Attendance Fee*

1. Full-time teachers in university dental schools.
2. Full-time graduate or postgraduate students in university orthodontic departments.
3. Dentists from outside Canada or the United States of America who are members of recognized dental or orthodontic organizations.

B. *Attendance Fee $10.00*

1. Associate or junior members of constituent societies of the American Association of Orthodontists.
2. Recent graduates of university orthodontic departments who are in service.

C. *Attendance Fee $20.00*

1. Recent graduates of university orthodontic departments who are not members of constituent societies of the American Association of Orthodontists.
2. Other guests certified by the Credentials Committee.
   To qualify under this heading you must:
   (a) Be endorsed by two active members of the American Association of Orthodontists in your vicinity.
   (b) Be a member in good standing of the American Dental Association.
   (c) Not have been rejected for membership in any of the constituent societies.

Those desiring to attend the meeting who qualify under the categories listed above should contact the chairman of the Credentials Committee for approval of their credentials.

Credentials Committee,
M. D. Edwards
Marion A. Flesher
Fredrick B. Lehman, Chairman
1107 Merchants National Bank Bldg.
Cedar Rapids, Iowa.

1957 Prize Essay Contest, American Association of Orthodontists

Eligibility.—Any member of the American Association of Orthodontists and any person affiliated with a recognized institution in the field of dentistry or associated with it as a teacher, researcher, undergraduate, or graduate student shall be eligible to enter the competition.

Character of Essay.—Each essay submitted must represent an original investigation and contain some new significant material of value to the art and science of orthodontics.

Prize.—A cash prize of $500.00 is offered for the essay judged to be the winner. The committee, however, reserves the right to omit the award if, in its judgment, none of the entries is considered to be worthy. Honorable mention will be awarded to those authors taking second and third places. The first three papers will become the property of the American Association of Orthodontists and will be published. All other essays will be returned.

Specifications.—All essays must be in English, typewritten on 8½ by 11 inch white paper, double spaced with at least 1 inch margins. Each sheet must be numbered and bound or assembled with paper fasteners in a "brief cover" for easy handling. The title of the essay should appear on the "brief cover." Three complete copies of each essay, including all illustrations, tables, and bibliography, must be submitted. The name and address of the author must not appear in the essay. For purpose of identification, the title of the essay, the author's name, together with a brief biographical sketch which sets forth his or her dental and/or orthodontic training, present activity, and status (practitioner, teacher, student, research worker, etc.) should be typed on a separate sheet of paper and enclosed in a plain sealed envelope. The envelope should carry the title of the essay.

Presentation.—The author of the winning essay will be invited to present it at the meeting of the American Association of Orthodontists to be held in New Orleans, Louisiana, May 13 through 16, 1957.

Judges.—The entries will be judged by the Research Committee of the American Association of Orthodontists.

Final Submission Date.—No essay will be considered for this competition unless received in triplicate on or before Jan. 10, 1957, by Dr. J. William Adams, Indiana University, School of Dentistry, Indianapolis, Indiana.

Alton W. Moore, Chairman, Research Committee
American Association of Orthodontists
University of Washington
School of Dentistry
Seattle 5, Washington

American Association of Orthodontists, 1957 Research Section Meeting

Continuing the policy of recent years, the program will consist of a series of ten-minute research reports which may be presented orally or read by title only. All persons engaged in research are urged to participate in this program, which will be held May 13 through 16, 1957, in New Orleans, Louisiana.

Each participant is asked to prepare a 250-word abstract for publication in the AMERICAN JOURNAL OF ORTHODONTICS. Abstract for publication and the ten-minute oral presentation at the meeting should be carefully prepared to present an adequate description of the import of your investigation.

Forms for use in submitting the title and 250-word abstract of your research will be sent to each dental school orthodontic department and to any individual requesting one. Please send your title and abstract as early as possible, but not later than Jan. 10, 1957, to Dr. William B. Downs, Graham Building, Aurora, Illinois.

Alton W. Moore, Chairman, Research Committee
American Association of Orthodontists
University of Washington
School of Dentistry
Seattle 5, Washington

American Board of Orthodontics

The next meeting of the American Board of Orthodontics will be held at the Roosevelt Hotel in New Orleans, Louisiana, May 7 through 11, 1957. Orthodontists who desire to be certified by the Board may obtain application blanks from the secretary, Dr. Wendell L. Wylie, University of California, School of Dentistry, San Francisco 22, California.

Applications for acceptance at the New Orleans meeting, leading to stipulation of examination requirement for the following year, must be filed before March 1, 1957. To be eligible, an applicant must have been an active member of the American Association of Orthodontists for at least two years.

American Association of Orthodontists 1957 Annual Meeting

Canal Street at Mardi Gras

Come Mardi Gras Day in New Orleans, climaxing the carnival session and the day before Lent begins, all traffic stops on Canal Street and the 170-foot-wide thoroughfare

Canal Street in New Orleans at Mardi Gras.

becomes a sea of milling humanity. The accompanying photograph shows part of the Rex Parade creeping through the concourse of human beings. The Rex Parade is followed by hundreds of truckloads of maskers.

The first organized Mardi Gras street pageant was held in New Orleans in 1838, although there was desultory masking in the streets prior to that time. The street pageants began to assume their present-day shape in 1857, when the Mistick Krewe of Comus, which still parades on Mardi Gras night, startled the populace with a torchlight procession based on Milton's "Paradise Lost."

In the center background is the Roosevelt Hotel, headquarters for the 1957 annual meeting of the American Association of Orthodontists. The four other hotels where rooms have been reserved are within three and one-half blocks of the Roosevelt. To the right, on Canal Street, the New Orleans and the Jung Hotels may be seen. The other two, not shown in the photograph, are the St. Charles, one block to the left of Canal Street, and the Monteleone, one block to the right.

Reservations should be made through Dr. Bertney G. Frick, Jr., 1231 Maison Blanche Bldg., New Orleans, Louisiana. Please state first, second, and third choice of hotels.

Northeastern Society of Orthodontists

The autumn meeting of the Northeastern Society of Orthodontists was held in the new Hotel Statler, in Hartford, Connecticut, on Oct. 28, 29, and 30, 1956.

A total of 371 members and guests registered for the three-day session, which commenced with a cocktail party on Sunday night and closed with table clinics and movies on Tuesday afternoon. A program of eight papers by seven clinicians was presented between Monday morning, when Vice-President Walter Bedell called the scientific session to order in the absence of President Oscar Jacobson, and Tuesday noon.

The program follows:

Cephalometric Evaluation of Orthodontic Therapy. Edward Lusterman.
Role of the Orthodontist in the Development of the Cleft Palate Face. Vincent P. Marran, Jr.
An Appraisal of the Effect of the Edgewise Arch Appliance in Modifying the Dentofacial Profile. Irving Buchin.
Facing Our Failures. Robert McGonagle.
Functional Anatomy of the Mandibular Musculature. Harry Sicher.
Growth of Skull and Face. Harry Sicher.
Mandibular Anchorage and Extraoral Force. Frank Kanter.
Cephalometric Assessment of Prepared Mandibular Anchorage. Max Fogel.

A proposed change in the constitution and by-laws received initial approval. This creates an Advisory Committee to the Executive Committee and will consist of the three immediate past-chairmen of former Executive Committees.

The Board of Censors submitted the following nominations for action at the annual meeting on March 4, 1957:

President, Walter G. Bedell.
Vice-president, Wilbur J. Prezzano.
Secretary-treasurer, David Mossberg.
Editor and sectional editor, Joseph D. Eby.
Assistant editor, Brainerd F. Swain.
Historian, Leuman M. Waugh.
Director to the A.A.O., Norman L. Hillyer.
Alternate Director, Richard A. Lowy.

Pacific Coast Society of Orthodontists

The Pacific Coast Society of Orthodontists held its twenty-fourth biennial general meeting Aug. 13 to 15, 1956, at the Benjamin Franklin Hotel in Seattle, Washington.

The meeting began with an address of welcome by Seatle's mayor, Gordon S. Clinton, and a response for the Society by Reuben L. Blake. President Arnold Stoller welcomed the members to Seattle. The complete text of his address is published elsewhere in this issue of the JOURNAL.

The following papers were presented:

Active and Passive Treatment With Soft and Hard Tissue Borne Appliances Alone and in Conjunction With Various Dental Orthodontic Appliances. Walter Reynolds Bedell, Poughkeepsie, New York.

The Development of Cleft Lip Repair and Its Orthodontic Significance. Robert F. Hagerty, Charleston, South Carolina.

Multiphase Philosophy and Technique. Francis Calmes and Victor Bowles, Kansas City, Missouri.

During the meetings of the Board of Directors, Secretary-Treasurer Raymond Curtner discussed the spectacular increase in the Society's membership. In February, 1953, there were 218 active members; at present there are 330 active and 83 associate members, making a total of 413. It was felt that this increase would undoubtedly continue and that in a few years the Pacific Coast Society might become the largest constituent of the American Association of Orthodontists.

Among the social and recreational activities were bus rides, a scenic cruise on Lake Washington, and dinner at the Seattle Yacht Club. Activities for the ladies included luncheon and entertainment at the Washington Athletic Club, a continental breakfast, and a "Frederick and Nelson" fashion show luncheon.

The following officers were elected:

President, A. Frank Heimlich, Santa Barbara, California.
President-Elect, Richard Railsback, Oakland, California.
Vice-President, Don MacEwan, Seattle, Washington.
Secretary-Treasurer, Raymond Curtner, San Francisco, California.
Editor-Librarian, Reuben Blake, San Francisco, California.

It was unanimously decided to hold the next meeting in Santa Barbara, California, in February, 1958.

The Dewey Memorial Award of The Southwestern Society of Orthodontists

PRESENTATION OF 1956 AWARD BY W. B. STEVENSON

The Dewey Memorial Award was created in 1953 by the Southwestern Society of Orthodontists to recognize that section's pioneers in orthodontics and to select some outstanding member each year whose contributions have added to the advancement of orthodontics.

The Dewey Memorial Award Committee were unanimous in their selection of the recipient for 1956. Dr. Homer B. Robison was selected for his long years of work in the various phases of orthodontics. He has conducted a large practice and has taken the time to deliver many lectures, scientific papers, and clinics.

It is especially fitting that Dr. Robison should receive the Dewey Memorial Award, because, in the words of Dr. Fred Richmond "Homer was always loyal and faithful to Martin Dewey—through thick and thin. Homer admired Martin very much and, as you know, made annual visits to New York City to visit with Martin and to lecture at the Dewey School of Orthodontics for many years. Homer was always a good friend of Martin's wife and Martin's mother, Emma. I am sure he was a great source of comfort to both of them following Martin's sudden passing in 1933."

Dr. Robison was born in Pennsylvania in 1881. After attending Central Normal College and Bethany College, he studied dentistry and was graduated from Kansas City-Western Dental College in 1907, almost fifty years ago. When he entered dental practice there were less than a dozen orthodontists in the work.

Dr. Robison's alert, inquiring mind, and enthusiasm for dentistry and orthodontics, his energy, and indomitable spirit have led him into various fields of study and research and have earned for him many positions of honor and trust.

HOMER B. ROBISON

He was vice-president of the American Dental Association in 1936, and vice-president of the American Association of Orthodontists in 1951. He was president of the Kansas State Dental Society in 1929 and of the Southwestern Society of Orthodontists in 1930; he also served as president of numerous local and district societies. In addition he has served on many boards and committees.

Dr. Robison, your contributions to dentistry and to our specialty, orthodontics, have earned for you this Dewey Memorial Award. As chairman of the Committee and in the name of the Southwestern Society of Orthodontists I present to you this certificate, a very small token of our appreciation of all that you have meant to us and our profession. May you continue to add to these contributions for many years to come.

ACCEPTANCE BY HOMER B. ROBISON

Mr. President, Members of the Dewey Award Committee, Fellow Members of the Southwestern Society of Orthodontists: In accepting this Award, I do so with deep humility, being fully cognizant of what a great leader Martin Dewey was. His brilliant mind will forever be an inspiration to many of us. I loved and admired Martin and we became close friends. I have spent many hours with him in association work in orthodontic societies and the American Dental Association, also lecturing in his school of orthodontics.

We frequently said that we were twins, as we were born on the same day of the same month and year.

I do not have sufficient words to express my appreciation for this honor, but I want you to know, fellow members, that it is with heartfelt gratitude that I say, "Thank you."

James M. Epperly Sworn in as Army Dental Chief

Brigadier General James M. Epperly, Army Dental Corps, was sworn in as Assistant Surgeon General of the Army and Chief of the Army Dental Corps at 8:30 A.M., Saturday, Dec. 1, 1956.

The ceremony was held in the office of the Army Surgeon General at the Main Navy Building. In attendance were four former chiefs of the Army Dental Corps, including Major General Oscar P. Snyder, the immediate past Chief who retired November 30; Brigadier General Leigh C. Fairbank; Major General Robert H. Mills; and Major General Walter D. Love, all from the Washington metropolitan area.

Among the other interested persons who accepted invitations to be present were Dr. E. H. Cushing, Deputy Secretary of Defense (Health and Medicine); Dr. Thomas P. Fox of Philadelphia, dental consultant to the Department of Defense Civilian Health and Medical Committee; Dr. J. E. Fauber, Assistant Chief Medical Director for Dentistry, Veterans Administration; and Brigadier General Arthur L. Irons, Director of Dental Activities, Walter Reed Army Medical Center.

Major General Silas B. Hays, Surgeon General of the Army, introduced the Army's new dental chief to the attending group after the ceremony.

On the eve of his departure for Washington, General Epperly was awarded the Certificate of Achievement by Major General William E. Shambora, Commanding General of the Brooke Army Medical Center, at a special honor guard ceremony at the Center's headquarters. Special mention was made in the citation of the progress made in educational opportunities for both officers and enlisted personnel of the Army at the Army Medical Service School located at the Center during General Epperly's assignment.

Oscar P. Snyder Joins Ohio State University Faculty

Formal announcement has been made by Ohio State University, Columbus, Ohio, that Major General Oscar P. Snyder, retiring Chief of the Army Dental Corps, will become affiliated with the faculty of its College of Dentistry in January, 1957.

General Snyder, who retired formally from the Army on November 30, will remain in Washington until he leaves for Ohio early in January.

French Society of Dentofacial Orthopedics

The thirtieth meeting of the French Society of Dentofacial Orthopedics will be held in Paris, France, May 30 to June 2, 1957. Members of the American Association of Orthodontists who are going to visit France next spring are cordially invited to attend this meeting.

For further information, write Madame L. Muller, President, 31 Rue de Moscou, Paris 8e, France.

European Orthodontic Congress and Rome Meeting of Fédération Dentaire Internationale

Special Tour Announcement

According to Dr. C. W. Carrick of Oberlin, Ohio, travel consultant for the United States section of Fédération Dentaire Internationale, a tour itinerary is available for those who may wish to attend both the European Orthodontic Society's Congress in Stockholm, Sweden, Aug. 9 to 13, 1957, and the Rome Congress of the Fédération Dentaire Internationale, Sept. 7 to 14, 1947.

The itinerary, which starts from Stockholm on August 14, includes visits to Copenhagen, Amsterdam, the Rhine country, the Black Forest, Lucerne, the Italian lakes, Como and Bellagio, Stresa, Milan, Venice, Florence, Perugia, Assisi, and a week in Rome. On September 14 one can fly directly home or join a ten-day extension tour to Spain.

For the trip to Stockholm, individual wishes are arranged on an independent basis due to there being so many ways one can get there. It is suggested that those interested write Dr. Carrick at once for further information.

University of Alabama

The University of Alabama Medical Center has announced something new in refresher courses: Insurance, Investment and Estate Planning, and Income Tax Guidance. These courses will be given in March of 1957.

Harvard University

Dr. John B. Macdonald has been named director of the Forsyth Dental Infirmary for Children and professor of oral microbiology in the Harvard School of Dental Medicine.

The selection of Dr. Macdonald, announced by Harvard University and the trustees of the Forsyth Infirmary, is the first joint appointment made by the two institutions since their affiliation in May, 1955.

University of Illinois College of Dentistry Offers Television Orthodontic Course

A one-day completely televised course on "The Examination and Analysis of Malocclusion of the Teeth" will be given by the University of Illinois College of Dentistry on Sunday, Feb. 3, 1957, 9 A.M. to 4 P.M. An effort will be made to demonstrate how a complete orthodontic examination is given and how the collected data are utilized. The course will include the making of observation directly from the patient and the utilization of intraoral and cephalometric x-ray pictures, laminagraphs, photographs, and models. All major conditions contributing to malocclusion will be illustrated from the records of actual cases.

University of Pittsburgh

The Graduate School of the University of Pittsburgh announces that it is now accepting applications for graduate study in orthodontics beginning with the school registration of 1957. Selections will be made from the applications received in March, 1957.

University of North Carolina

The University of North Carolina, School of Dentistry, announces a two-day course in cephalometrics to be given March 11 and 12, 1957, by Drs. L. B. Higley and R. M. Nelson and staff and a course in occlusal equilibration to be given March 13, 1957, by Dr. J. Wilfred Gallagher and staff.

Eastman Dental Dispensary

A two-year course in orthodontics under the direction of Dr. J. D. Subtelny is being offered by the Eastman Dental Dispensary in Rochester, New York. Arrangements permit the earning of a Master of Science degree by those enrolling for supplementary courses at the University of Rochester, School of Medicine and Dentistry.

Notes of Interest

Max R. Moore, D.D.S., announces his association with Dr. Francis M. Calmes and Dr. Victor Drumm Bowles, Plaza Parkway Bldg., Suite 417, 4620 J. C. Nichols Parkway, Kansas City, Missouri, practice limited to orthodontics.

Dr. J. A. Salzmann announces that Dr. M. M. Feldman is now associated with him at 654 Madison Ave., New York, New York.

Dr. Richard H. Stucklen announces the removal of his office from Wilmington, Delaware, to 611 North Matlack St., West Chester, Pennsylvania, practice limited to orthodontics.

George S. Uchiyama, D.D.S., M.S., and Vernon E. Truetzel, D.D.S., M.S., announce their association for the practice of orthodontics at 7252 Natural Bridge Rd., Normandy, Missouri.

OFFFICERS OF ORTHODONTIC SOCIETIES

The AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS is composed of a representative of each one of the component societies of the American Association of Orthodontists.

American Association of Orthodontists

President, A. C. Broussard - - - - - - - - - Maison Blanche Bldg., New Orleans, La.
President-Elect, Franklin A. Squires - - - - - - - - Medical Centre, White Plains, N. Y.
Vice-President, William B. Stevenson - - - - - - - - 610 West 8th St., Amarillo, Texas
Secretary-Treasurer, Earl E. Shepard - - - - - - - - - - 8230 Forsyth, St. Louis, Mo.

Central Section of the American Association of Orthodontists

President, Thomas D. Speidel - - - - - - - - - University of Minnesota Dental School, Minneapolis, Minn.
Vice-President, John R. Thompson - - - - - - - - 55 E. Washington St., Chicago, Ill.
Secretary-Treasurer, William F. Ford - - - - - - - - - 575 Lincoln Ave., Winnetka, Ill.

Great Lakes Society of Orthodontists

President, Harlow L. Shehan - - - - - - - 601 Jackson City Bank Bldg., Jackson, Mich.
Vice-President, Richard C. Beatty - - - - - - - - 1140 Hanna Bldg., Cleveland, Ohio
Secretary, D. C. Miller - - - - - - - - - - - 40 South Third St., Columbus, Ohio
Treasurer, Russell E. Huber - - - - - - - - 350 Fidelity Medical Bldg., Dayton, Ohio

Middle Atlantic Society of Orthodontists

President, Aubrey P. Sager - - - - - - - - 1210 Medical Arts Bldg., Philadelphia, Pa.
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Secretary-Treasurer, Paul A. Deems - - - - - - - - - 835 Park Ave., Baltimore, Md.

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Vice-President, Walter Bedell - - - - - - - - - - 49 Market St., Poughkeepsie, N. Y.
Secretary-Treasurer, Wilbur J. Prezzano - - - - - - Medical Centre, White Plains, N. Y.

Pacific Coast Society of Orthodontists

President, A. Frank Heimlich - - - - - - - - - 1824 State St., Santa Barbara, Calif.
Vice-President, Donald C. MacEwan - - - - - - 925 Fourth and Pike Bldg., Seattle, Wash.
Secretary-Treasurer, Raymond M. Curtner - - - - - 450 Sutter St., San Francisco, Calif.

Rocky Mountain Society of Orthodontists

President, J. Lyndon Carman - - - - - - - - - - 501 Republic Bldg., Denver, Colo.
Vice-President, Howard L. Wilson - - - - - - - - 1107 Republic Bldg., Denver, Colo.
Secretary-Treasurer, H. Carlyle Pollock, Jr. - - - - - - 1558 Humboldt St., Denver, Colo.

Southern Society of Orthodontists

President, Frank P. Bowyer - - - - - - - - - 608 Medical Arts Bldg., Knoxville, Tenn.
Vice-President, William Weichselbaum - - - - - - - 115 E. Gwinnett St., Savannah, Ga.
Secretary-Treasurer, H. K. Terry - - - - - - - - - 2742 Biscayne Blvd., Miami, Fla.

Southwestern Society of Orthodontists

President, Tom M. Williams - - - - - - - - - 612 Medical Arts Bldg., Dallas, Texas
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President, Ernest L. Johnson - - - - - - - - - - 450 Sutter St., San Francisco, Calif.
Vice-President, Lowrie J. Porter - - - - - - - - - 41 East 57th St., New York, N. Y.
Secretary, Wendell L. Wylie - - - - - - University of California School of Dentistry, The Medical Center, San Francisco, Calif.
Treasurer, Jacob A. Salzmann - - - - - - - - - 654 Madison Ave., New York, N. Y.
Director, William R. Humphrey - - - - - - - - - - Republic Bldg., Denver, Colo.
Director, L. Bodine Higley - - - - - - University of North Carolina, Chapel Hill, N. C.
Director, B. F. Dewel - - - - - - - - - - - - 708 Church St., Evanston, Ill.

A List of the Orthodontic Societies of the World and Their Principal Officers*

Chicago Association of Orthodontists

President, Joseph R. Jarabak - - - - - - - - - - 230 165th St., Hammond, Ind.
President-Elect, George L. Christopher - - - - - - - - 9504 S. Hamilton, Chicago, Ill.
Secretary-Treasurer, Russell K. Ephland - - - - - - 3 S. Prospect Ave., Park Ridge, Ill.

Orthodontic Alumni Society of Columbia University

President, Richard Pasternak - - - - - - - - - - 30 W. 59th St., New York, N. Y.
Vice-President, Henry P. Levy - - - - - - - - - 8522 5th Ave., Brooklyn, N. Y.
Secretary, Walter G. Spengeman - - - - - - - 301 Bronxville Rd., Bronxville, N. Y.
Treasurer, Herbert Fine - - - - - - - - - Two Gramatan Ave., Mt. Vernon, N. Y.

Harvard Society of Orthodontists

President, Bernard C. Rogell - - - - - - - - - - 6 Pleasant St., Malden, Mass.
Vice-President, Ben Wayburn - - - - - - - - - 67 Coddington St., Quincy, Mass.
Secretary, Milton J. Meyers - - - - - - - - - 281 Haverhill St., Lawrence, Mass.
Treasurer, Clifford G. Hunt - - - - - - - - - 14 Muzzey St., Lexington, Mass.

Kansas State Orthodontic Society

President, J. Victor Benton - - - - - - - - - Union National Bldg., Wichita, Kan.
Secretary-Treasurer, Howard H. Dukes - - - - - Brotherhood Bldg., Kansas City, Kan.

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President, Irving Lederman - - - - - - - - - 45-54 41st St., Long Island City, N. Y.
Vice-President, Leon Gecker - - - - - - - - - 305 West 72nd St., New York, N. Y.
Secretary-Treasurer, Nathan J. Sachs - - - - - 84-75 168th St., Jamaica, L. I., N. Y.

New York University Orthodontic Society

President, Sol J. Lurie - - - - - - - - - - - 1 Hanson Pl., Brooklyn, N. Y.
Vice-President, Benjamin Falk - - - - - - - - 2742 Pitkin Ave., Brooklyn, N. Y.
Secretary-Treasurer, Jerome Teitelbaum - - - - - 163 E. 178th St., New York, N. Y.

Oklahoma State Orthodontists Society

President, Harry Sorrels - - - - - - - - Medical Arts Bldg., Oklahoma City, Okla.
Secretary, Bob Knarr - - - - - - - - - - - Medical Arts Bldg., Tulsa, Okla.

Philadelphia Society of Orthodontists

President, Paul V. Reid - - - - - - - - - - Medical Arts Bldg., Philadelphia, Pa.
Secretary-Treasurer, Warren Bieler - - - - - 1208 Medical Arts Bldg., Philadelphia, Pa.

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*In the January issue of the AMERICAN JOURNAL OF ORTHODONTICS is published each year a list of the orthodontic societies of the world of which the JOURNAL has any record, along with the names and addresses of their principal officers.

The JOURNAL keeps a file for each of these societies and publishes the names that appear in that file as of the date of going to press.

St. Louis Society of Orthodontists

President, Carl L. Rister - - - - - - - - - - - University Club Bldg., St. Louis, Mo.
Vice-President, Everett W. Bedell - - - - - - - 1504 S. Grand Blvd., St. Louis, Mo.
Secretary-Treasurer, Robert E. Hennessy - - - - - 8013 Maryland Blvd., St. Louis, Mo.

Orthodontic Section of Canadian Dental Association

Chairman, J. T. Crouch - - - - - - - - - - 185 St. Clair Ave., West, Toronto, Ontario
Vice-Chairman, M. L. Donigan - - - - - - - - - 1414 Drummond St., Montreal, Quebec
Secretary, A. R. Winn - - - - - - - - - - - Medical Arts Bldg., Montreal, Quebec
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Vice-President, W. K. Shultis - - - - - - - - - 1 Heath St., W., Toronto, Ontario
Secretary-Treasurer, R. A. Erickson - - - - - - 86 Bloor St., W., Toronto, Ontario

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President, William Tweed - - - - - - - - - - - Valley Bank Bldg., Tucson, Ariz.
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J. W. Softley - - - - - - - - - - - - - - - 56 Rodney St., Liverpool, 1
Hon. Treasurer, J. S. Beresford - - - - - - - - 31 Queen Anne St., London, W. 1
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Vice-President, Juan Colin M. - - - - - - - - - Augustinas 715 of 111, Santiago
Secretary, Sergio Troncoso M. - - - - - - - - - Providencia 1017, Santiago
Treasurer, Pedro Gandulfo G. - - - - - - - - - - Londres No. 63, Santiago

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Vice-President, Juan Diaz Zayas-Bazan - - - - - - - - 23 No. 307 Vedado, Havana
Secretary, Thais de los Santos - - - - - - - - - - - - L #301, Vedado, Havana
Treasurer, Dario Gandarias Reineke -

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Treasurer, W. H. S. Sypkens - - - - - - - - - - - - Hoflaan C 118, Middelharnis

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Hon. Secretary, D. P. Walther - - - - - Royal Dental Hospital, London, W.C. 2, England

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Secretary, G. Gugny - - - - - - - - - - - - - - - - 20, Rue Mogador, Paris, 9°
Treasurer, R. X. O'meyer - - - - - - - - - - - - 93, Rue du Commerce, Paris, 15°

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Secretary, Enrique Estrada H. - - - - - - - - - - - 11 Calle 10-61, Guatemala City

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Treasurer, J. Ben-Amar - - - - - - - - - - - - - - - 6 Kernikowsky St., Tel-Aviv

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Secretary, Roberto Vivanco -
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Vice-President, Augusto Taiman Villar - - - - - - - - - - - Arzobispo 284, Lima
Secretary, Naldo Balarezo Gerstein - - - - - - - - - - - - - - Ica 138, Of. B.
Treasurer, Demetrio Calderón - - - - - - - - - - - - - - - - - Ortiz 369, Lima

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Secretary, Irene Sundvall-Hagland - - - - - - - - - Folkungagatan 110, Stockholm
Allan Hellgren - Sveavägen 88, Stockholm
Anders Lundström - Stureplan 19, Stockholm

Forthcoming meetings of the American Association of Orthodontists:
1957—Roosevelt Hotel, New Orleans, Louisiana, May 12 to 16.
1958—Commodore Hotel, New York, New York, April 27 to May 1.
1959—Statler Hotel, Detroit, Michigan, May 4 to 7.

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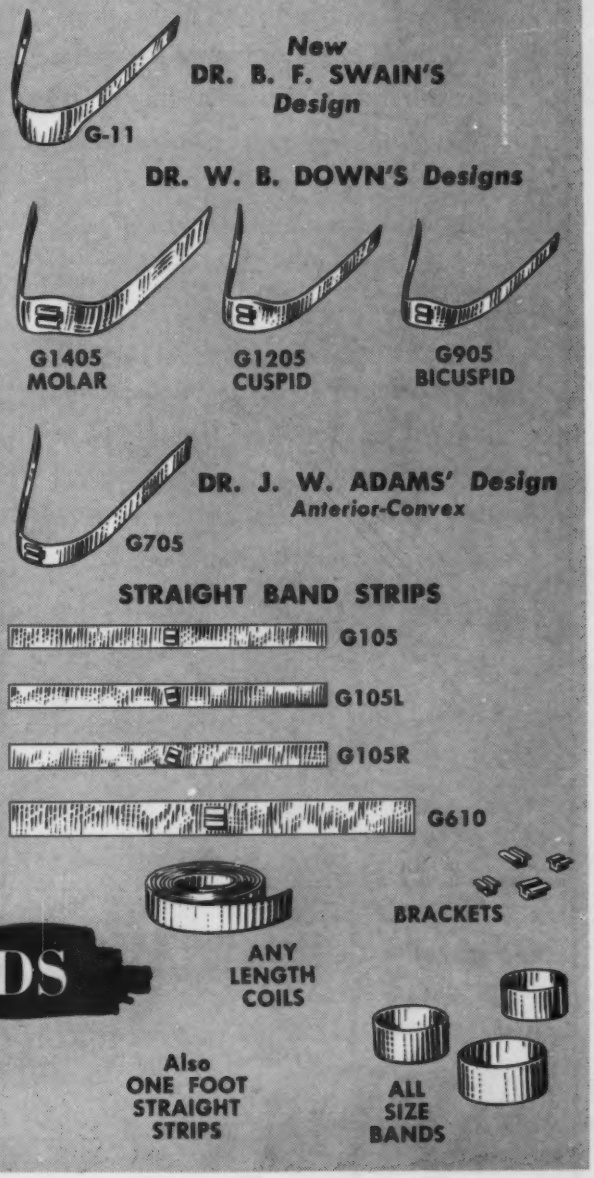

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JOSEPH P. WEINMANN, M.D., College of Dentistry, University of Illinois; and HARRY SICHER, M.D., D.Sc., School of Dentistry, Loyola University, Chicago

2nd edition • 508 pages • 302 illustrations

This book is an attempt to eliminate the differences between the diverse viewpoints of those who, clinically and microscopically, roentgenologically and chemically, examine bone and bones and of those who experiment with bone and bones. It tries to bury once and for all the specters of "halisteresis or decalcification," "interstitial growth of bone," "physical plasticity," and "creeping replacement," which are resurrected again and again by the magic of the imagination.

In preparing the second edition the authors tried to apply the same general principles of biology to a consideration of the many advances which have since been made in the knowledge of the histology and biochemistry of the fascinating tissue we call bone. For the first time it seems possible to outline more fully a hypothetical mechanism of bone formation and resorption and to present a basic concept of skeletal growth, especially of the growth of the skull.

The first part has been enlarged by a discussion of some of the peculiar features of the otic capsule; to the second was added a discussion of osteoid osteomas and cementomas, of fibrous dysplasia of bone, and of some peculiar genetic disturbances of the skeleton.

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Textbook of

FUNCTIONAL JAW ORTHOPAEDICS

by

PROFESSOR KARL HAUPL, Professor of Dental Surgery, University Dental School, Innsbruck; WILLIAM J. GROSSMANN, Orthodontic Consultant and Lecturer in Orthodontics, University College Hospital Dental School, London; and PATRICK CLARKSON, Honorary Civilian Consultant Plastic Surgeon, The Queen Alexandra Hospital, London.

408 pages, 536 illustrations.

In this textbook on Functional Jaw Orthopaedics the authors have endeavored to present an up-to-date view of the theoretical basis and the practical aspects of functional orthodontic therapy. The latter aims at bringing about, as far as is possible, the necessary tissue changes by means of functional stimulation. In addition, the book covers the use of active removable appliances such as were developed by A. M. Schwarz. In the chapter on Etiology and Diagnosis the authors have tried to survey the views held by all those dental schools which have been primarily responsible for the development of the removable appliance.

In the section on Histology the authors have given an account of the histological investigation of cases treated by functional appliances, together with the results of animal experiments designed to show the influence of function on development.

A chapter has been included on orthodontic surgery, as the authors are aware of the opinion that the closest cooperation between plastic surgeon and orthodontist is necessary if the best functional and aesthetic results are to be achieved in those cases which will not respond to conservative orthodontic therapy.

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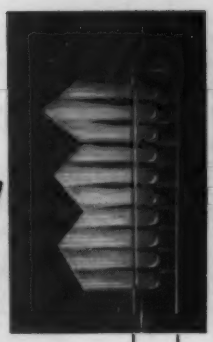

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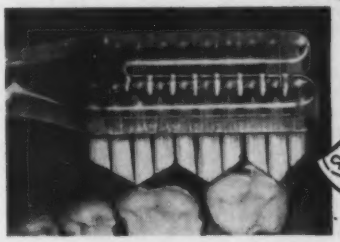

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Long end-tuft for picking.
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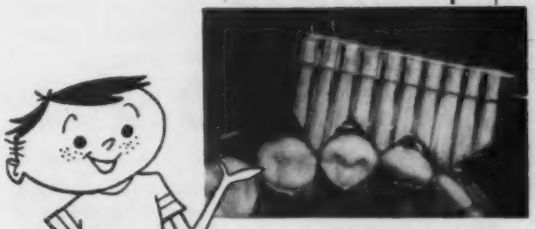

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by

GEORGE M. ANDERSON, D.D.S.

Formerly Professor of Orthodontics, Baltimore College of Dental Surgery, Dental School, University of Maryland.

With Chapters by: Bernard Wolf Weinberger, B. Holly Broadbent, Alfred Paul Rogers, Earl W. Swinehart, Chester F. Wright, and Edward A. Kitlowski.

Eighth Edition. 702 Pages. 719 Illustrations.

This has been a standard text for many, many years, covering the sound principles of orthodontics and giving the reader material on occlusion, extraction, the approach to treatment, methods and aids to treatment, along with mechanistic procedures for orthodontic problems.

This edition contains 24% more text material and 12% more illustrations.

The term "normal occlusion" is analyzed and defined so that it better fits the adaptive pattern of the individual.

The quilibration of occlusion to eliminate disharmonies and as an aid to orthodontic treatment results is an addition to the text.

Inheritance, vital factor in all life processes, but in particular as it affects facial form, receives attention.

Additions of anthropometric considerations and cephalometric appraisal indicate the importance each of these fields has assumed in orthodontic practice.

Prophylactic or preventive orthodontics is included, and habits as an etiological factor are more definitely emphasized because of the public's interest and what might be called confusion in understanding how habits create forces which develop malocclusion of the teeth.

Extraction as an aid to treatment is broken down in its component parts, so that from incisors to third molars reasons for and against the practice are stated and discussed in much detail.

There is new material on cleft palate and the effect of musculature as an aid in the newborn infant in cleft closure. The entirely new subject of osteoporosis or craniotabes as it affects the skull, face, and jaws and influences malocclusion is included.

Mechanistic improvement in the removable appliance field adds a real measure of technical interest, and the addition or more material relative to extraoral anchorage in the former of cervicalor head strap outlines the possibilities in this intriguing phase of clinical effort.

Methods to aid in the betterment of business details and improvements in records are described and illustrated, for they comprise a most important adjunct in the smooth conduct of a busy practice.

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A Treatise on the Recognition, Identification, and Treatment of Diseases of the Oral Regions

by

JOSEPH L. BERNIER, D.D.S., M.S., F.D.A., R.C.S. (Eng.) Colonel, Dental Corps, United States Army; Chief, Oral Pathology Branch, Armed Forces Institute of Pathology; Pathologist to the Registry of Oral Pathology of the American Dental Association; Professor of Oral Pathology, Georgetown University of Dentistry.

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- To clarify many unnecessarily complicated concepts regarding oral disease, by presenting explanations couched in simple language.
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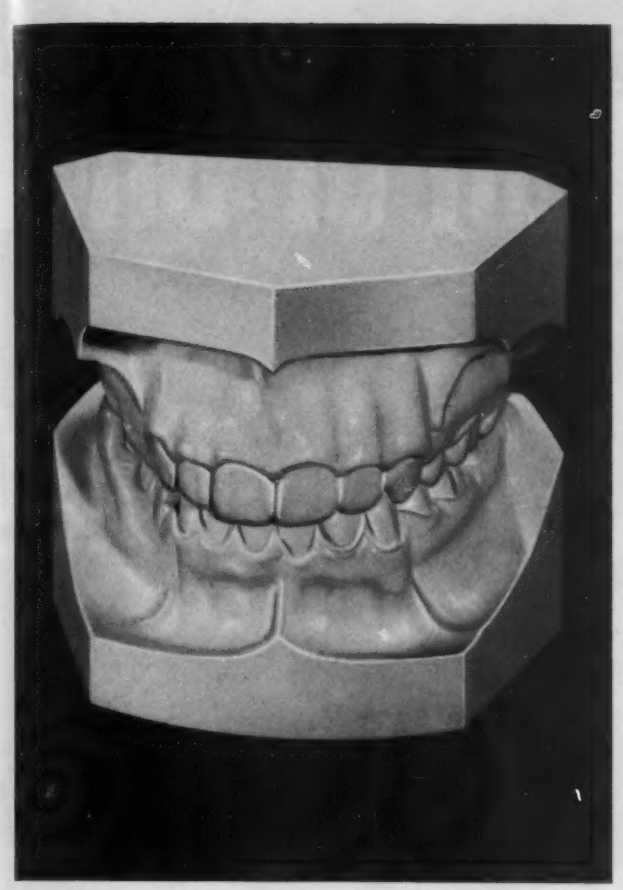

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